SIEMENS

UROSKOP ACCESS

SP

Startup

System

for ASPIA Imaging System

English
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Document revision level

The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

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Requirements

Tools and auxiliaries required

NOTE	**All tools, measuring and auxiliary devices with the exception of the standard installation tools are listed and specified in the Service Tools Catalogue (part of the Spare Part Catalogue).**

NOTE	**Only calibrated test equipment may be used.**

Water bucket > 5 l and measuring cup for 1 l of water	n.a.
Service PC as specified in ARTD-001.719.06	n.a.
5 m service cable	99 00 440 RE 999
Digital multimeter, e. g. Fluke 8060 A	97 02 101 Y4290
Phase-sequence indicator	97 02 713 X7933
Line resistance meter	84 28 104 RE999
mAs meter	81 60 400 RE999
Precision X-ray filter	99 00 598 XE999
Set of Cu filters (10 pcs. of 0.3 mm Cu each)	44 06 120 RV090
Centering cross	96 60 051 RE999
Ground wire tester[1]	44 15 899 RV090
ESD equipment type 8501 - 3M	97 02 606 Y3121
Oscilloscope, e. g. Fluke Scope 3390 A	99 00 861 RE999
Resolution test type 41/42	28 71 820 RE999
Mavo monitor	97 02 432 Y0526
PTW DIADOS Required for measuring the skin dose rate only in areas where the DHHS regulations apply (otherwise not required for testing at start-up, unless there are deviations and resetting is necessary).	97 17 612 Y0388
Densitometer, e. g. DensiX-LE 52003[2]	49 51 286Y0388
Safety Tester Unimet 1100[3]	

1. The safety tester Unimet 1100 can be used as replacement for this measuring equipment.
2. Has to be ordered at following address:

PEHA med Geraete GmbH
Muehlstrasse 38
65843 Sulzbach
Germany
Phone (+49) 61 96-5 00 40 30
Fax (+49) 61 96-5 00 40 50
(see also http://www.pehamed.de)

3. This universal test meter can be used for testing the electrical safety of medical equipment per DIN VDE 0751 and EN 60601.

Additionally required documents

Acceptance Test Certificate § 16	n. a.
General Service Issues; Service PC and Service Software	ARTD-001.719.06
Image Quality Quick Test	SPL5-330.820.01
Installation Protocol	3783300-FPR-01S
Medical Products; Safety Information; General Safety Notes	TD00-000.860.01
POLYDOROS SX65/80 Wiring Diagram	RX63-055.844.01
Safety and Radiation Protection Guidelines	ARTD-002.731.02
Software Description; UROSKOP Access Imaging System VA14A	SPL5-330.815.05
SP Planning Guide UROSKOP Access	SPL5-330.891.01
Test Certificate POLYDOROS SX65/80	n. a.
Test Certificate UROSKOP Access	n. a.
Troubleshooting Guide; Endoscopy Option	SPL5-330.840.01
UROSKOP Access Circuit Diagram	SPL5-330.844
UROSKOP Access Online Help	n. a.
UROSKOP Access Operating Instructions	n. a.

Safety information

General safety information

⚠WARNING

Danger of damage to property, injury, death!

Non-observance can lead to damage to property, injury or death.

Observe the general safety information

- in this document,
- in the document "Medical Products; Safety Information; General Safety Notes" and
- the safety information according to ARTD part 2.

General safety information - electrical

⚠WARNING

Electrical safety!

Non-observance can lead to damage to property, serious injury up to death.

- After opening of the covers live parts are accessible. To prevent danger, the system has to be disconnected from the mains supply prior to opening of covers.
- If working under voltage is necessary, the general safety information according to the document "Medical Products; Safety Information; General Safety Notes" must be observed.

⚠CAUTION

Live parts!

Non-observance can lead to damage to property.

Observe the ESD directives for working on the system.

Live parts (generator off)

Generator

- Before working on the generator, switch the generator off at the "power-off"-switch on board D160.

⚠WARNING

With the generator switched off, line voltage is still applied to transformer T1 and to the D160 closing circuit (see POLYDOROS SX 65/80 Wiring Diagram). After the generator has been switched off, a direct voltage of approx. 600 V remains applied to the inverter! This is indicated by LEDs V35 and V36 on board D110.

Non-observance can lead to damage to property, serious injury up to death.

The voltage drops to 0 V within approx. 2 minutes; the LEDs go out at approx. 30 V. The warning notes (labels) in the generator cabinet must be observed.

Imaging System

⚠WARNING

With the generator switched off, a line voltage of approx. 400 V remains applied to the M16 (power supply module) of the imaging system (see UROSKOP Access wiring diagram).

Non-observance can lead to damage to property, serious injury up to death.

Set the system power switch on the control console to the "off" position to disconnect the imaging system including all its components from the mains supply.

Unit

⚠WARNING

After disconnecting the drive converters from the voltage supply, live parts of the equipment and power connections of the Lenze drives must not be touched immediately as the capacitors may still be charged. After disconnection hazardous voltage is still present at the Lenze drive for up to 5 minutes through the DC link capacitors.

Non-observance can lead to damage to property, serious injury up to death.

No work must be performed on the motors or the DC link terminals of the Lenze drives until after this period has passed. The warning notes (labels) on the Lenze drives must be observed.

Safety information - radiation

⚠WARNING

Radiation!

Non-observance can lead to illnesses, irreversible damage to body cells and genetic make-up up to death.

- During work at the system, when radiation has to be released, the Safety and Radiation Protection Guidelines according ARTD-002.731.02 have to be observed.
- Observe that:
  - existing radiation protection devices are used;
  - radiation protection clothes are worn;
  - the distance to the source of radiation is as large as possible;
  - radiation is only released if necessary;
  - the setup values are as low as possible (low kV and mA values; short switch-on time) and
  - the switch-on time is as low as possible.

Safety information - mechanical

⚠CAUTION

Danger of burns on hot parts or components!

Non-observance can lead to light to medium burns, especially of the hands.

- After covers are opened, parts and components (esp. cooling elements, high-performance parts) are accessible which can show temperatures > 50°C.
- To prevent burns due to touching parts and components the system has to be switched off and has to cool down for at least 5 minutes.

⚠CAUTION

Danger or injuries on mechanical parts! After covers are opened, parts like plugs, threaded bolts, shortened cable fixations and edges of components can be touched which could lead due to lack of attention to contusions, abrasions and cuts of the skin, especially of the hands.

Non-observance can lead to light to medium injuries, especially of the hands.

- Perform such work with special attention and carefulness.
- Wear suitable protective gloves.

Switching high voltage/radiation off

- To avoid unintentional release of high voltage or radiation, set the switch S1 (SS) on D100 to "off".

  This leads to disabling of inverters.

Disabling unit movements

- Before performing any service or maintenance work on the unit, actuate the red emergency stop button.

  The emergency stop button is located at the front of the unit on the side of the foot-end lifting base cover and on the control console.

Product-specific information

Country-specific acceptance test certificates

The following tests and checks for acceptance tests required in Germany according to the X-ray Ordinance (Röntgenverordnung, §16) and for acceptance tests in the USA have been performed in the factory and recorded on the test certificates:

- Visual check of filter values
- Fluoroscopic field limitation
- Centering of radiation field center and monitor center
- Fluoroscopic dose rate
- Functional check of the Iontomat measuring fields
- Maximum skin dose rate
- Resolution and minimum contrast
- Check of kV accuracy
- Accuracy of X-ray tube voltage
- Accuracy of voltage indication during fluoroscopy
- Reproducibility of radiation

NOTE	**These measured values as well as the values determined at system startup can be copied from the test certificate to the acceptance test certificate.**

The following tests and checks required according to the DHHS regulations must be performed:

1. Documents required for the customer
2. Radiation protection
3. Checking of DHHS and identification labels

Information on startup

- The system must be completely cabled.
- The system has been preassembled, programmed and tested in the factory.
- The test certificates are filed in the blue system binder.
- When starting up the system, verify that the settings have not changed by performing the necessary tests and measurements.

Conventions and abbreviations

acc.	according
D	Optical density of the film
D_N	Net optical density (D - fog)
DR	Exposure
ESD	Electrostatically-sensitive device
f_K	Correction factor for the dose detector
FL	Fluoroscopy
I.I.	Image intensifier
K_B	Dose, dose rate measured in the image receptor plane
K_T	Dose, dose rate measured on the tabletop
LED	Light-emitting diode
LP	Line pair
m	Unit attenuation factor
pcs.	Pieces
PG	Planning Guide
R_G	Visual resolution
ROW	Rest of the world
S	Speed of a film-screen system
SID	Source-image distance
SPC	Service PC
SS	Service switch
SSW	Service software
UI	User Interface of UROSKOP ACCESS imaging system
US	Ultrasound

Tolerances

General tolerances for length dimensions according to ISO 2768

Limits for nominal size range	over 3 mm to 6 mm	over 6 mm to 30 mm	over 30 mm to 120 mm	over 120 mm to 400 mm	over 400 mm to 1000 mm	over 1000 mm to 2000 mm	over 2000 mm to 4000 mm
Permissible tolerance	**± 0.5 mm**	**± 1 mm**	**± 1.5 mm**	**± 2.5 mm**	**± 4 mm**	**± 6 mm**	**± 8 mm**

- These tolerances apply to all dimensions specified in these instructions unless a different tolerance is expressly stated after the value.

Tightening torques

- The permissible tolerance for tightening torques stated is + 10%.

Checks and tests

Functional test of the emergency stop buttons

- Acuate the emergency stop buttons on the remote control console and on the unit.

  Safety contactors K1, K2 drop out audibly.

- Unlock the emergency stop buttons.

  Safety contactors K1, K2 pick up audibly.

Testing the protective ground wire

NOTE

The following first ground wire test must be performed for the safety of startup personnel.

The final ground wire test is performed at the end of the startup procedure. Therefore the documentation applies only to the final ground wire test which delivers the initial measurement value.

The initial measurement value is used as a comparative value for subsequent measurements and must be documented.

- Perform the ground wire test according DIN VDE 0751, part 1 (ARTD part 2).

  It has to be ensured that the system is completely installed, all covers are attached and all ground wire connections have been made. Test the protective ground wire resistance between the protective conductor bus bar for the entire system or the protective contact at the unit plugs and any accessible, conductive part of the product that can conduct voltage in cases of error.

The acquired measuring values have to be documented and evaluated together with information about the used measuring device (type and serial number).

The protective ground wire resistance may not exceed 0.2 Ohm.

NOTE

Ensure that control or data cabling does not affect ground wire connections.

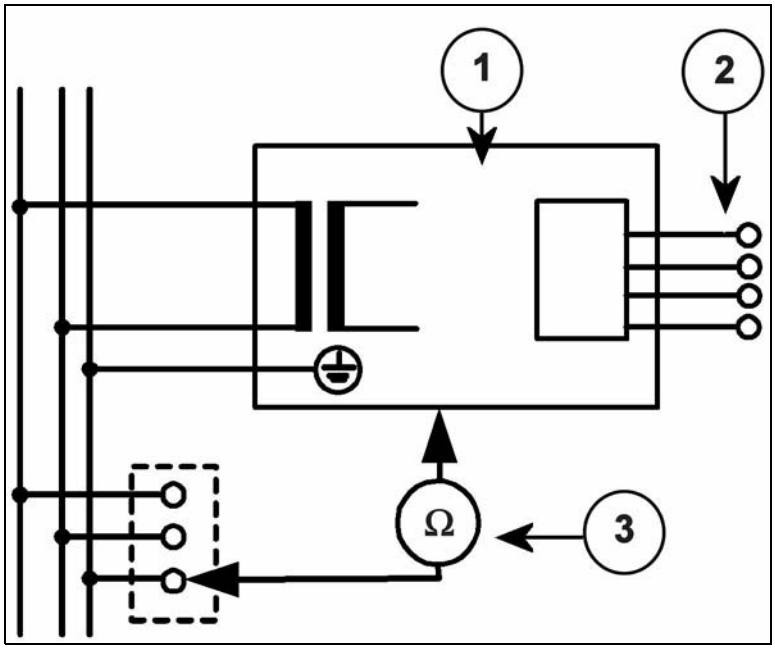


Fig. 1 Measurement circuit for protective ground wire measurement of systems with hard-wired connections; according DIN VDE 0751-1:2001-10, C3

1 - System
2 - Applied part type B
3 - Measurement application (integrated in measuring device)

Determining the veiling luminance

- To avoid any problems during acceptance tests for monitors according to DIN 68 68 - 57, the lighting conditions in the control room and examination room must be tested as early as possible.
- To do this, measure the veiling luminance using an approved luminance meter with the diagnostic image display devices in the usual operating position.
- The room lighting is adjusted to the brightness required for the relevant medical application (check with the user), using a dimmer and scale, for example.
- The diagnostic monitor remains switched off.
- Using the luminance meter, measure the veiling luminance of the diagnostic monitor at a distance from the monitor to be specified by the manufacturer.
- If the veiling luminance is less than 2 cd/m^2, it can be expected that the minimum requirements of the acceptance test for image display devices to be performed later will be met.
- If, however the veiling luminance is higher, the operator and/or site supervisor must be notified immediately so that corrective measures can be taken (further defined reduction of illuminance, covering of windows, etc). Also refer to the relevant note in the project manager's manual or document "SP Planning Guide; UROSKOP Access" (PG).
- These measurements are necessary to ensure that the minimum requirements for acceptance and constancy tests for image display devices according to DIN 68 68 - 57 are fulfilled.

Mains connection

Measuring the line voltage

- Remove the blade-type fuses F1, F2 and F3 (POLYDOROS SX 65/80; M16).
- Switch off the automatic circuit breaker F456.
- Switch system contactor "on".

- Measure the line voltage at terminal strip M16 K20 at the terminals L1, L2, L3, N, PE.

  The voltage must correspond to the specifications in the "Test certificate UROSKOP Access" (filed in the blue system binder).

- Switch system contactor "off".

Checking for correct phase sequence

- Connect the phase-sequence indicator to terminals L1, L2 and L3 (mains side).
- Switch system contactor "on".

- Check the rotating field and correct, if necessary.
- Switch system contactor "off".
- Disconnect the phase-sequence indicator.

Measuring the internal line resistance (mains quality)

- Connect the line resistance meter to M16.L1, L2, L3 (POLYDOROS SX 65/80 Wiring Diagram) and measure the internal line resistance (phase against phase successively).
- Connect the line resistance meter between each 2 phases of L1, L2, L3.
- Switch system contactor "on".

- Perform the measurement.
- Switch system contactor "off".
- Reconnect the meter and perform the measurement for the other phases.
- Reinsert the blade-type fuses M16 F1, F2 and F3 and switch on the automatic circuit breaker F456.

NOTE **For maximum generator output the internal line resistance measured must not exceed the following values (Tab. 1).**

U_{mains}	max. R_{mains} with POLYDOROS SX	
	65 kW	80 kW
400 V	0.17 Ohm	0.11 Ohm
440 V	0.20 Ohm	0.14 Ohm
480 V	0.24 Ohm	0.16 Ohm

Tab. 1 Internal line resistance

- Record the measured values in the "Test certificate UROSKOP Access".
- If the internal line resistance is higher, the tube current must be limited correspondingly as described in subchapter "Limitation of tube current".

Limitation of tube current

- Start the XCS SSW and select the menu "Configure/Site Structure".

  The following window appears.

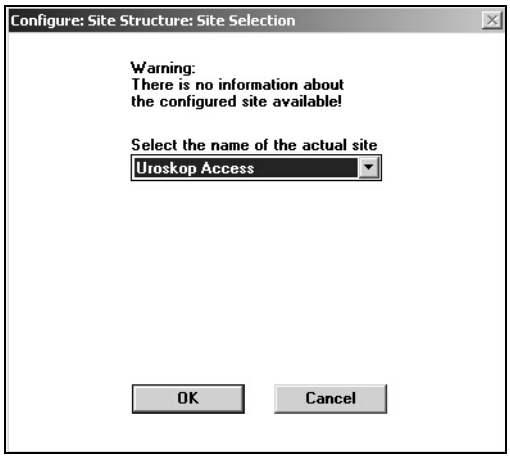


Fig. 2 Configure: Site Structure: Site Selection

- Select "Uroskop Access" in the drop-down menu "Select the name of the actual site" and confirm with "OK".

  The following window appears.

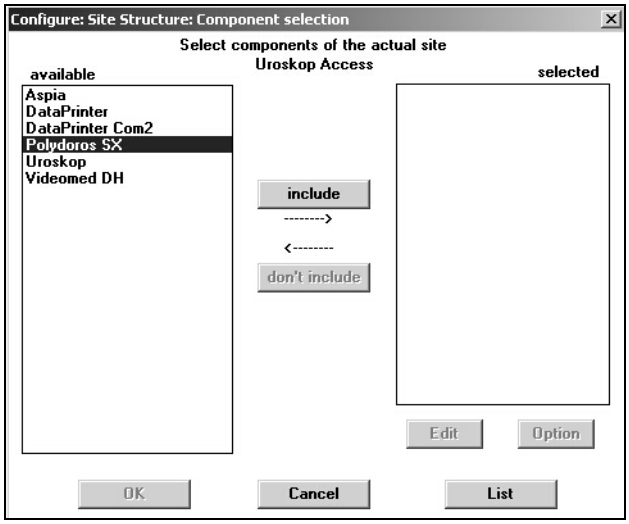


Fig. 3 Configure: Site Structure: Component Selection

- Select "Polydoros SX" under "available" and confirm with "include".

The following window appears.

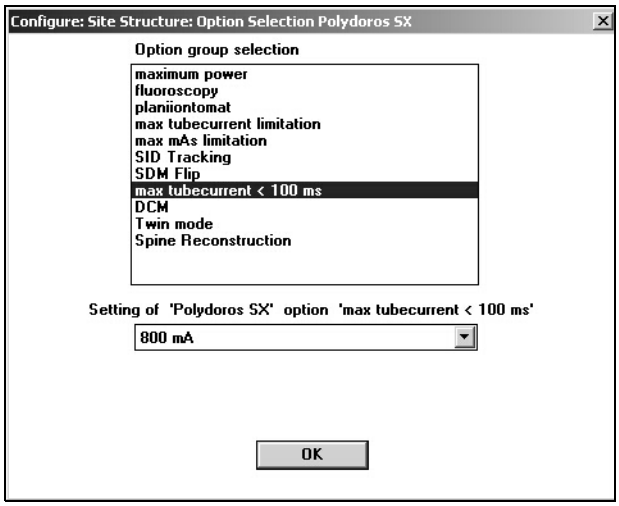


Fig. 4 Configure: Site Structure: Option Selection Polydoros SX

- Select "max tubecurrent limitation" under "Option group selection".
- Enter a reduced equivalent value for the parameter.

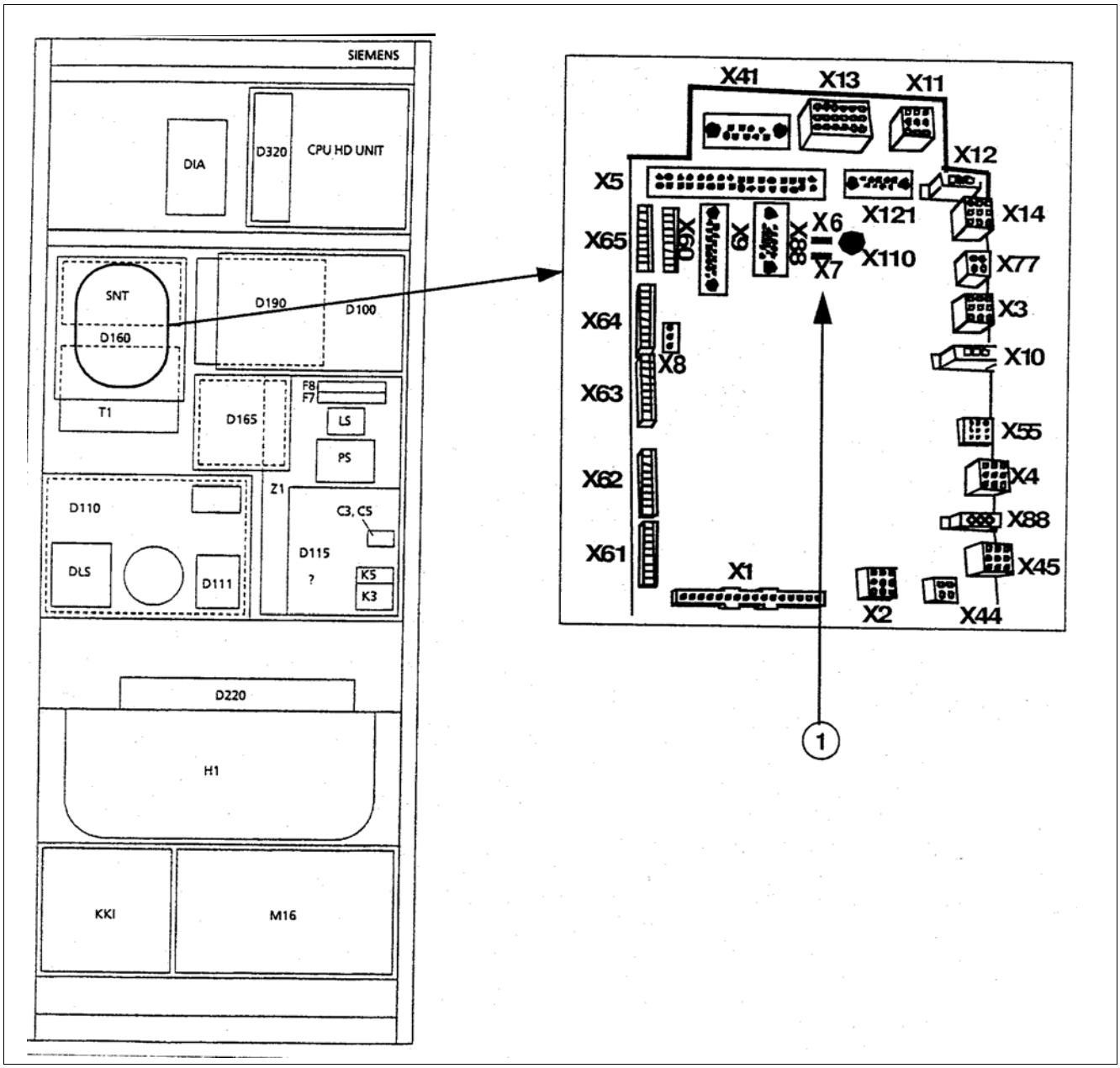


Fig. 5 Polydoros SX 65/80 - D160

Checking for inadmissible ground connections

- After separating the connection between PE and $0V_L$, measure in the generator power cabinet if there are any inadmissible ground connections.
- Remove jumper X6-X7 (Fig. 5) on D160.
- Measure the resistance between X6 ($0V_L$) and X7 (PE).
- The resistance must be > 30 kOhm for the wired system.
- Reinsert jumper X6-X7 on D160.

Switching on the system (imaging system)

- On D100 in the generator, set the switch S1 (SS) to "off" (disabling of inverters).
- Switch the system on at the control panel.
- The imaging system is ready for operation after approx. 5 minutes.

Functional test of VIDEOMED DHC

LED	Function
Green	Voltage supply ok
Orange	Input/output ok
Red	Lights up during exposure

Tab. 2 Overview of signal LED's on the DHC camera

Functional test of the XCS network

- The general function of the XCS network is indicated by the following 7-segment displays and LED's:

	XDU-D320	V11	"0" point flashing
		V12	"0" point flashing green LED on; Com- HW
POLYDOROS SX	D100	V14	"b" is displayed, point flashing

NOTE **If errors are shown on the 7-segment displays, refer to the XCS SSW main program, Help.**

Installing the SSW on the service PC

NOTE	**XCS SSW will only run on PCs with Windows 95/98, not NT.**

XCS service software

The CD-ROM "XCS Service SW" can be found in the blue system binder. The backup of the system parameters is on the "site data disk".

NOTE	**Do not use an old XCS SSW version. Before installing the new software, any existing old XCS SSW directories must be renamed, e.g. to "SSWold".** **The directory "c:\SSW" proposed during the installation is preassigned. Do not change it!** **Only use the XCS SSW supplied with the system.**

- Start Windows on the service PC.
- Insert the CD-ROM of the supplied XCS service software into the CD-ROM drive.
- Select "File/Execute" or "Start/Execute" after selecting the "Start" button.
- In the command line, type "<CD-ROM>:\install" and confirm with 'Enter'.

  By confirming the screen masks shown during the installation, the XCS SSW is automatically installed on the hard disk.

UROSKOP Access Online Help

The floppy disk "UROSKOP Access Online Help" can be found in the blue system binder.

- Insert the disk of the supplied UROSKOP Access Online Help into the floppy disk drive of the service PC.
- Select "File/Execute" or "Start/Execute" in the menu bar after selecting the "Start" button.
- Type in the command line "a:\install" and confirm with 'Enter'.

  By confirming the screen masks shown during the installation, the SSW is automatically installed on the hard disk.

Connecting the service PC to the generator

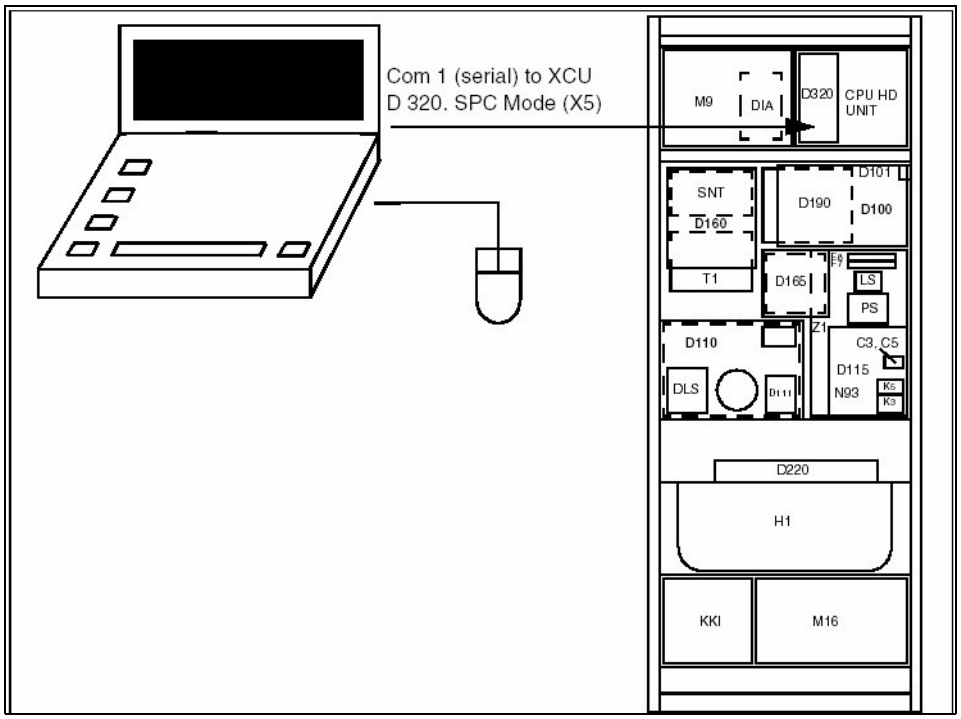
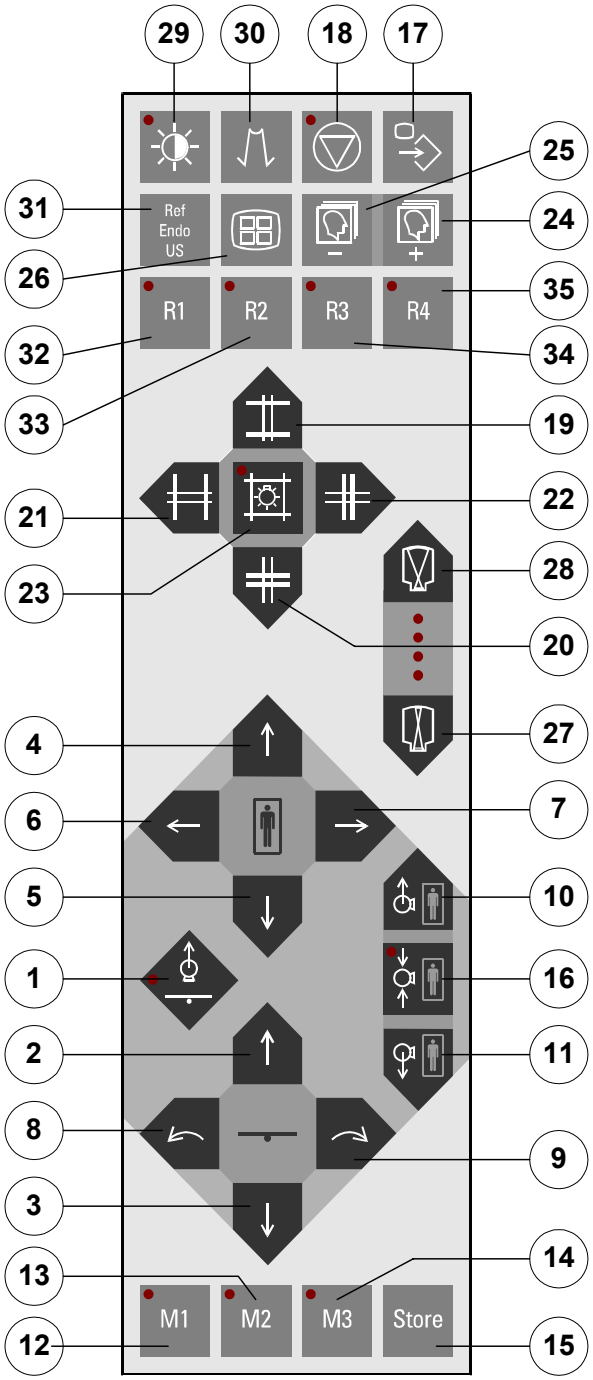


Fig. 1 Connection service PC

- Connect the service PC to the POLYDOROS SX65/80 generator as shown (Fig. 1).

Tableside control unit (overview)



Key functions
1) Tube unit park position
2) Raise table
3) Lower table
4) Table longitudinal headwards
5) Table longitudinal footwards
6) Table transverse left
7) Table transverse right
8) Table tilt left
9) Table tilt right
10) System longitudinal headwards
11) System longitudinal footwards
12) Memory 1
13) Memory 2
14) Memory 3
15) Store position
16) Exposure pos. system longitudinal
17) Store ATB image
18) FL automatic stop
19) Height diaphragm open
20) Height diaphragm closed
21) Width diaphragm open
22) Width diaphragm closed
23) Light localizer / full format
24) Image +
25) Image -
26) Split screen
27) Zoom +
28) Zoom -
29) Windowing (W1, W2)
30) Edge Enhancement (F1, F2, F3)
31) Ref/Endo/US selector
32) Reserve 1
33) Reserve 2
34) Reserve 3
35) Reserve 4

Fig. 1 Tableside control unit

System foot switch (option)

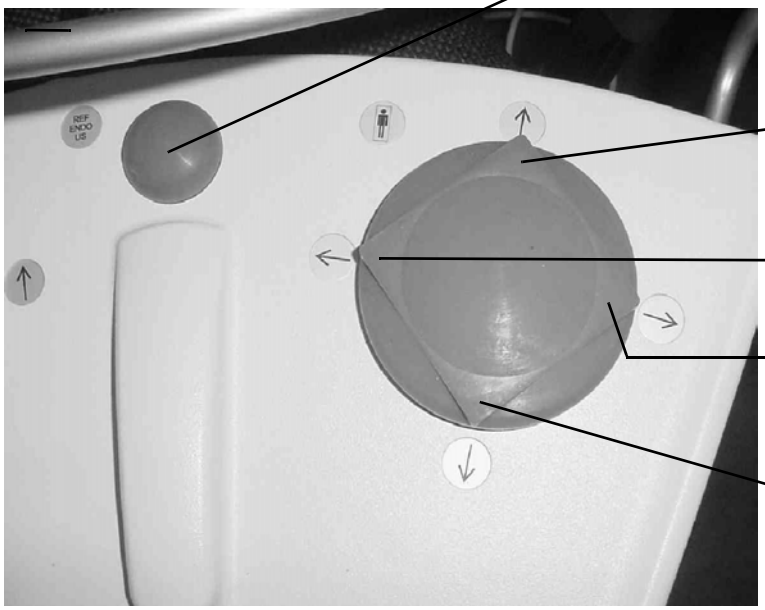


Fig. 2 System footswitch - 1

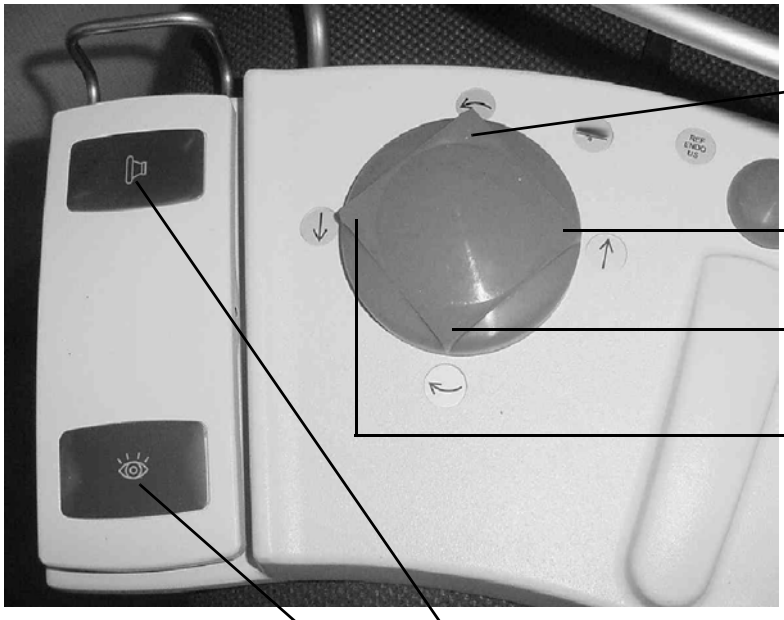


Fig. 3 System footswitch - 2

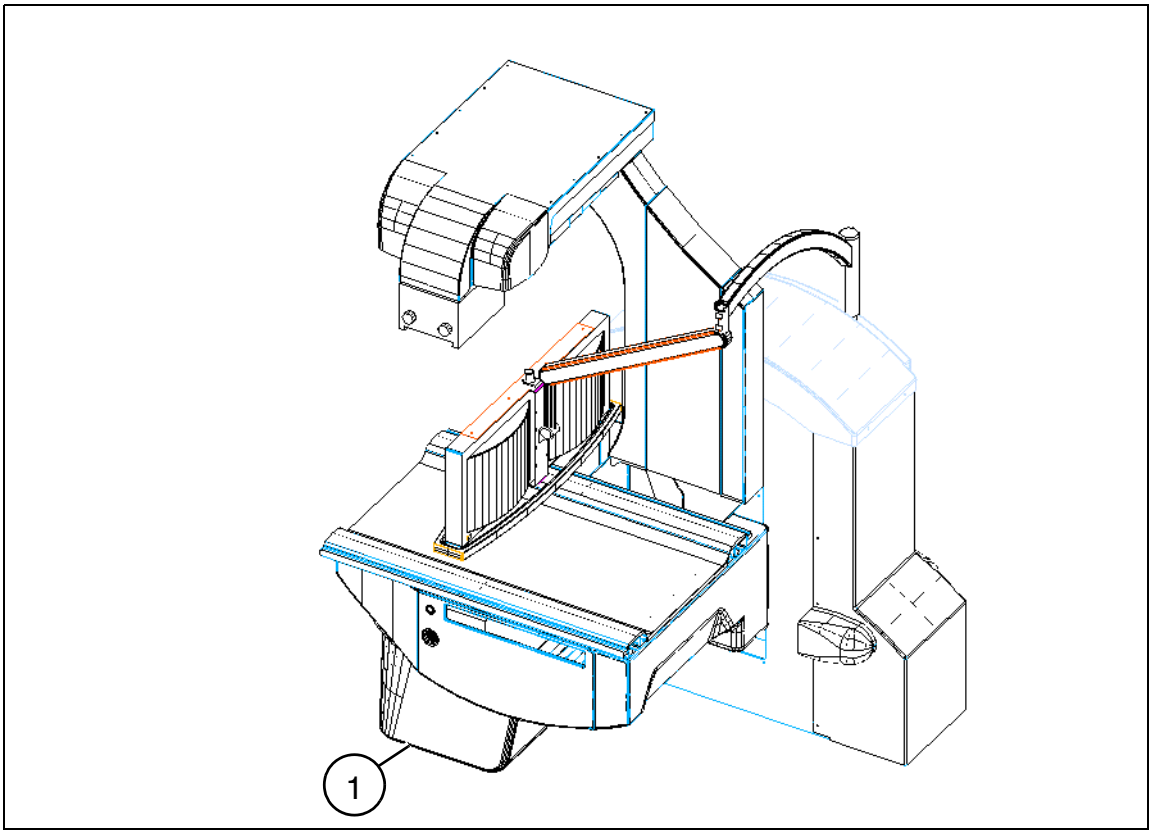


Fig. 4 UROSKOP Access

Safety limit switches

NOTE	**Risk of crush injuries!** **When performing the following test of the safety limit switches ensure that no unintentional unit movements are initiated.**

I.I. collision protection

- Manually operate the safety devices (1/Fig. 4).

  The safety contactors drop out audibly.

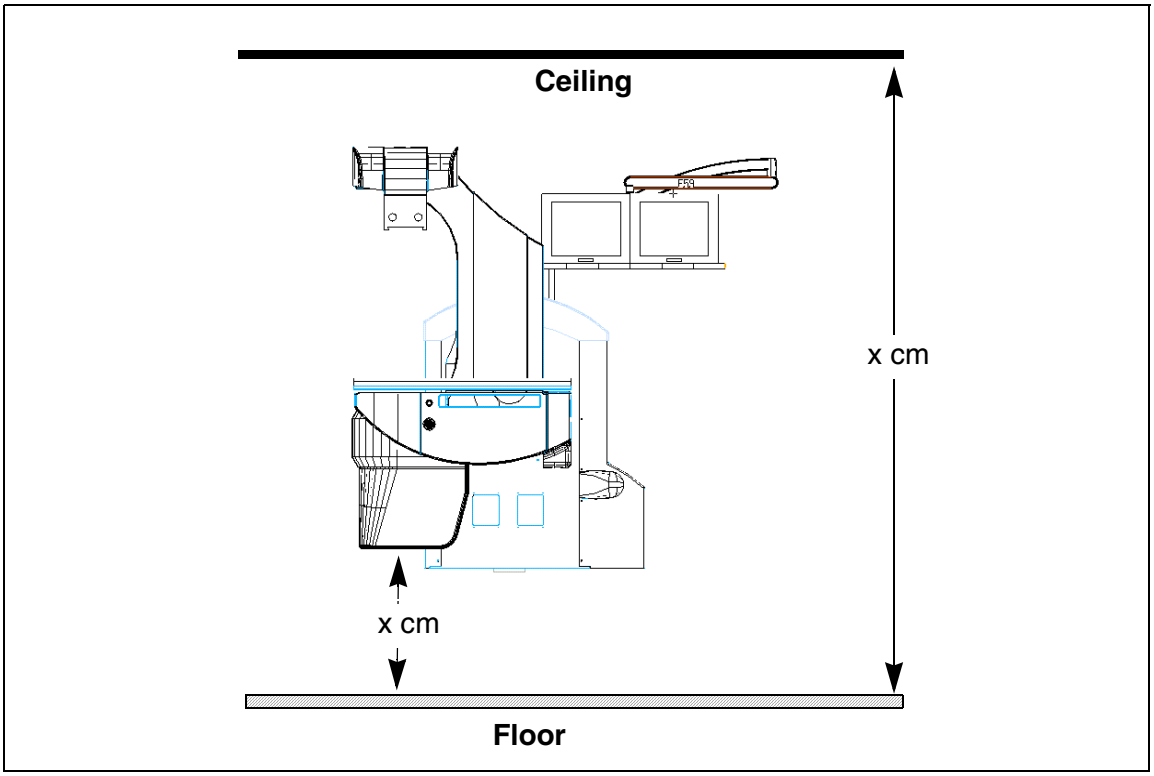


Fig. 5 Ceiling height

Room dimensions

NOTE	**The collision computer allows for attachment of a footboard at the head-end and foot-end, i.e. for calculation purposes the table length is considered to be extended by 30 cm at both ends.**

A: Ceiling height

- Measure the distance from the floor to the ceiling (Fig. 5).

B: Distance from the floor

- Measure the minimum distance from the floor to the image intensifier (without I.I. collision protection) (Fig. 5).

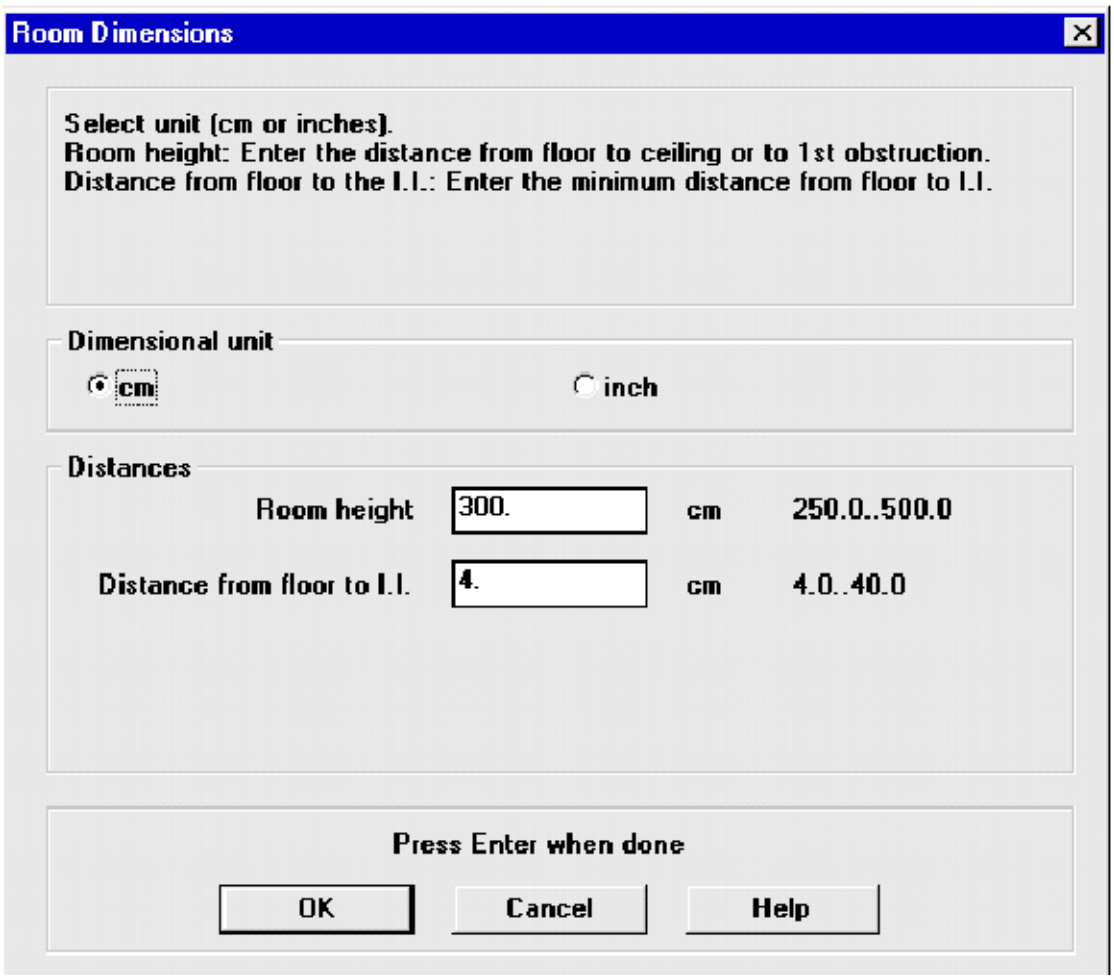


Fig. 6 Room dimensions screenshot

Room dimensions

- Select "Components/ UROSKOP ACCESS/ Adjustments/ Room Dimensions" in the XCS SSW.
- Enter the "Room height" and the "Distance from floor to I. I." in the "Room Dimensions" window of the SSW and confirm with "OK" (Fig. 6).

NOTE	**The distance 4...40 cm entered in the SSW refers to the distance between the bottom edge of the I.I. and the floor and must be at least 4 cm. The distance between the I.I. collision protection and the floor is therefore approx. 2 cm less. The factory default setting is 6 cm.**

Checking the distance from the floor

- Move the unit in the 0° position.
- Position the unit in the center of the travel range and move it to the minimum table height.
- Measure the distance from the lowest point of the I.I. to the floor (Fig. 5).

  Desired value: D $\geq$ 4 cm

If the distance D is < 4 cm:
- Record the difference to the desired distance;
- Move the unit from the lowest position of the lifting base to the highest position.
- Increase the input value for "Distance from floor to I.I." by the difference recorded.

- Check the distance by moving the unit into the lowest position of the lifting base again.
- Terminate the XCS SSW.
- Switch the system off.
- Shut the system down completely and then switch it on again.

Tabletop

Checking footward tabletop movement

- Position the tabletop approx. flush with frame.
- Move the longitudinal carriage approximately into the center of the travel range.
- Position the unit completely upright.
- Lower the tabletop all the way to the end position.
- Measure the distance from the floor to the lowest point of the tabletop.

  Desired value: Distance from the floor approx. 34 cm (without footboard)
- For units with (footboard attached) tabletop, lower the tabletop further towards the floor and measure the distance.

  Desired value: Distance from the floor at least 4 cm.

Unit movements

- Check the functions of the keys on the tableside control unit and optional system foot switch according chapter "System foot switch (option)" on Page 4 - 2.

  The tableside control unit must be tested in all plug locations of the basic unit.
- Move the TFT support arm to the park position.
- Check that all unit movements are carried out smoothly and without any considerable noise.
- Perform all unit movements in sequence, actuating an emergency stop button during each movement.
  - The movements must be interrupted on actuation of the emergency stop button and enabled again once the respective emergency stop button has been unlocked.

- Set a tilting angle of 0° and move the tube out of the exposure position.
  - Radiation release must be disabled.
- Move the tube back into the exposure position.
- Move the TFT support arm out of the park position.
- Perform a tilting movement.
  - Tilt movement is possible only in the range ± 15° and (± 85° to 90°).
- Move the TFT support arm back into the park position.

- Release FL and press the emergency stop buttons in sequence while radiation is being released.

NOTE	**In each case, radiation must be switched off on actuation of the emergency stop button.**

- It must be possible to release radiation again for FL with the emergency stop button pressed.
  - The drives remain disabled for as long as an emergency stop button is pressed.
- Lower the table and activate the collision protection at the bottom of the I.I. during the downward movement.
- On activation of the collision protection the downward movement must be disabled for as long as the collision protection is activated.

Starting up the generator

Testing the generator without high voltage

Testing the starter

- Switch SS "off" (switch S1 on PC board D100 in the generator).
- Select a new patient at the UROSKOP Access imaging system.
- Select fluoroscopy.
- Actuate the exposure release button

  The rotating anode runs up.
- Release the exposure release button:

  The rotating anode is slowed down.

Testing the generator with high voltage

Warming up the tube assembly

- Switch SS "on" (switch S1 on PC board D100 in the generator)..

NOTE	**With the POLYDOROS SX 65/80 generator, manual fluoroscopic kV adjustment is possible only in the SSW. Gradually place the Cu filters in the beam path. This increases the tube current and voltage. If necessary, place a lead apron into the beam path.**

- Open the collimator leaves fully.
- Perform the menu item "Warm-up" in the XCS SSWmenu.

Checking the max. generator output

- Remove the I.I. voltage supply (Z108), fuse F10, in the generator cabinet (for reasons of I.I. and TV camera).
- Place the lead apron on the I.I. input in addition.
- Select "Components/POLYDOROS SX/ Diagnosis/ Nominal Power" in the XCS SSW and choose following parameter.
  - Tube 1
  - Large focus
  - 100 kV
  - 65 mAs (65 kW) or 80 mAs (80 kW)
  - 3 point technique
  - 100 ms
- Connect the oscilloscope to the following measuring points on board D100 to check the tube voltage and current:

kV_actual (X61)	1 V $\hat{=}$ 20 kV	0 V/A_GND (X61)
mA_actual (X64)	1 V $\hat{=}$ 200 mA	
	1 V $\hat{=}$ 1 mA	
Trigger: SWR (X64)		

- Release exposure and measure the kV and mA values with the oscilloscope.
- Determine the maximum output from the kV and mA values measured as follows:

$$P_{max} = \frac{kV \cdot mA}{1000} (kW)$$

Fig. 7

- Enter the output (kW) calculated and the current (mA) measured into the "Test certificate UROSKOP ACCESS".
- Reinsert the I.I. power supply (Z108), fuse F10, in the generator cabinet.

Checking the fluoroscopic field limitation and centering

NOTE	**The TV camera centering and the fluoroscopic field limitation have been set in the factory. Ensure that these default settings have not changed during transport and installation.**

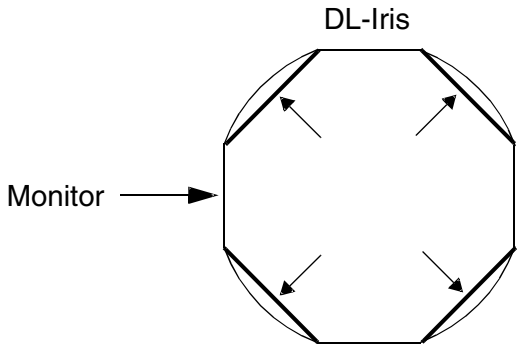


Fig. 8

- Set the unit to the 0° position.
- Set I.I. full format.
- Release FL.
- Open the collimator leaves fully and check whether the leaves are just visible centrically along the edge of the blanking circle (Fig. 8).
- Check the diagonal iris leaves for all zoom formats.
- Check the display of the collimator leaves for all zoom formats.

NOTE	**The relevant tests required under the X-ray regulations of the relevant country (e. g. USA (DHHS), Germany (§16)..) must be performed.**

NOTE	**Both collimator leaves and iris leaves are in the collimator.**

Correction

- Start the XCS SSW.
- Select the menu "Components/Uroskop/Adjustment/Calibration/Collimator/Indirect technique, fluoroscopy field limitation/execute".
- Using the "± " buttons to set the diagonal iris leaves under fluoroscopy.
- Confirm with "OK".

  A window showing the new and the old value appears.
- Confirm with "OK".

  The new value is stored only in the unit.
- Exit the XCS SSW and switch the system off and on again for permanent storage in the XCU.
- Check the settings.

Creating test program for dose adjustment (if not available)

- Select "Configuration" in the UI under "Options".

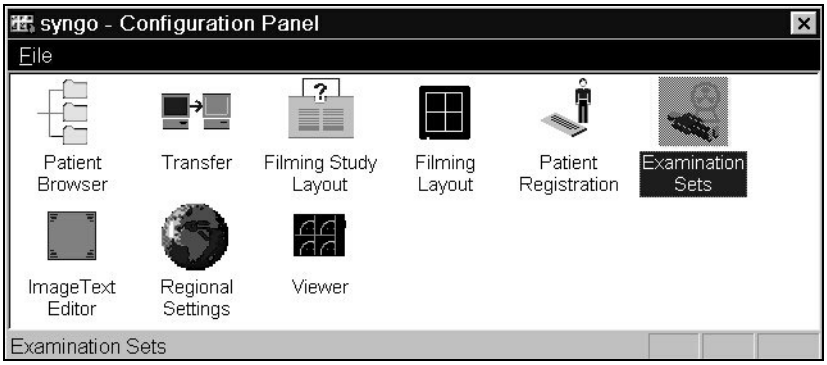


Fig. 9 Configuration Panel

- Double-click on "Examination Sets".

  The "User program configuration" window is displayed.

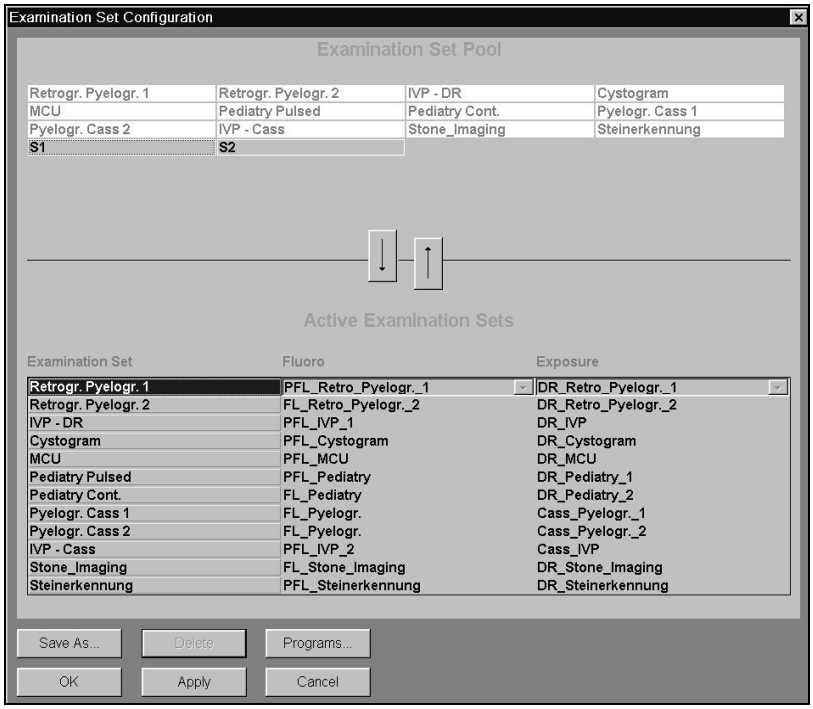


Fig. 10 Eximation Set Configuration

- Select an arbitrary existing program under "Examination Set" and select the "Save as" button.

  A "Save as" pop-up window is displayed.

- Enter "Test DL kont." in the "Save as" window and confirm by clicking on "OK".
- Select the "Programs" button.

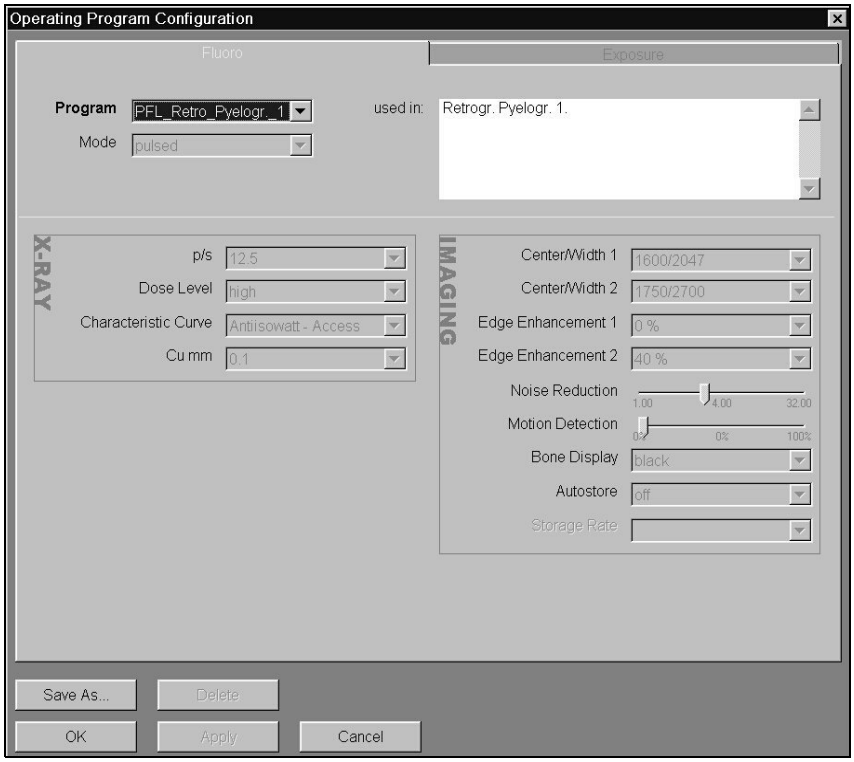


Fig. 11 Program Configuration

- Select the "Save as" button.

  A "Save as" pop-up window is displayed.
- Enter an arbitrary name in the "Save as" window and confirm by clicking on the "OK" button.
- Enter the individual set values for fluoroscopy according to Tab. 1 and save the changes with the "Apply" button.
- Change to the "Exposure" task card and select the "Save as" button.

  A "Save as" pop-up window is displayed.
- Enter an arbitrary name in the "Save as" window and confirm by clicking on the "OK" button.
- Enter the individual set values according to Tab. 1 and save the changes with the "Apply" button.
- As described above, duplicate a further program and enter the program name "Test DL pulsed".
- Then select the "Fluoro" and "Exposure" task cards as described above and enter and save the parameters listed under '"Test DL pulsed" program' (Tab. 1).

"Test DL kont." program		"Test DL pulsed" program	
Fluoro	Exposure	Fluoro	Exposure
Operating mode "continuous DL"	Operating mode "DR 1-point technique"	Operating mode "pulsed DL"	Operating mode "DR 0-point technique"
Dose level "Medium"	Tube voltage "70 kV manual"	Dose level "Medium"	Derivation curve "C74 - special"
Characteristic "C03 Iodine"	Dose level "Medium"	Frame rate "12.5 f/s"	Dose level "Medium"
Cu filter "none"	Cu filter "none"	Dose level "Antiiso Access"	Cu filter "0.1 mm"
	I.I. format "Overview"	Cu filter "0.1 mm".	Frame rate "4 f/s"
	Dominant "middle"		I.I. format "Overview"
			Dominant "middle"

Tab. 1 Test programs dose adjustment

Testing the KermaX (option)

- Select I.I. full format.
- Attach 2.1 mm Cu to the collimator.
- Select a patient and the "Test FL cont." test program.
- Choose the DIADOS settings as follows:
  - Mode "Dose",
  - Range "mGy",
  - Filter "2.5 mm Al".
- Place the measurement chamber on the tabletop in the beam path.
- Place the centering cross on the tabletop, centrally to the radiation field.

- With fluoroscopy switched on, collimate a field of approx. 20 cm x 20 cm with the rectangular diaphragms.

  Make sure that the measurement chamber is fully illuminated.
- Calculate and record the area "A" of the collimated field on the monitor.
- Remove the 2.1 mm Cu filter and the centering cross.
- Switch off the I.I. voltage supply.
- Read the area dose product $ADP_{a(start)}$ off the ASPIA monitor and take note of it.

- Release radiation for approx. 10 s.
- Read the incident dose K_E off the dose meter and record it.
- Calculate the area dose product ADP_g from the formula $ADP_g = A \times K_E$.

- Read the area dose product $ADP_{a(end)}$ off the ASPIA monitor, subtract the previously noted value $ADP_{a(start)}$ from the value $ADP_{a(end)}$ and record the difference ADP_a.
- Calculate the deviation from the following formula:

$$deviation\ (\%) = \left(\frac{ADPa - ADPg}{ADPg} x100 \right) \leq 30\%$$

- The calculated value must be < 30 %.
- Terminate the Service menu and exit with "Cancel".

General

Switching off the imaging system

Normal condition - The application has been started and the system works correctly.

NOTE	**If the system remains switched of for more than 10 seconds, the imaging system is also shut down. This takes approx. 3 minutes.**

Fault condition

NOTE	**If the imaging system is not shut down after the system has been switched off at the generator, e.g. if the computer has crashed, it can be switched off by switching off the main voltage supply via the system contactor. If no system contactor is available, the PC must be switched off with the switch on the front of the PC.**

PDA and dose control

NOTE	**The following must be observed when performing measurements for the Image Quality Quick Test:** **- If the light is switched on in the image distributor to determine the position of the PDA (D100.S1), this lamp is automatically switched off again after a few seconds. If switch S1 is not reset to normal, FL will no longer function.** **- If there is a Diamentor chamber, this must be taken into account for indirect dose control (same measuring setup as for factory measurement).**

Switching on the imaging system

- Switch the system on and wait for it to boot.

  This takes approx. 4 minutes.
- Create a new patient (e. g. emergency patient).
- Select a set of examinations (organ program) at the imaging system UI.
- Move the object, e.g. precision X-ray filter, into the beam path.

- Start fluoroscopy/radiography at the imaging system.
- Acquire a couple of DR test exposures to test the function.

Imaging system configuration

- Set/check the configuration and network settings on the basis of the Last Call document from logistics.
- The UROSKOP Access imaging system Aspia is started up according to the document "Software Description; UROSKOP Access Imaging System VA14A".

Checks and adjustments

NOTE	**The following required adjustments are performed in the service mode.**

Date and time

The date and time are set in the XCU with the XCS SSW.

- Start the XCS SSW on your service laptop (Fig. 1).

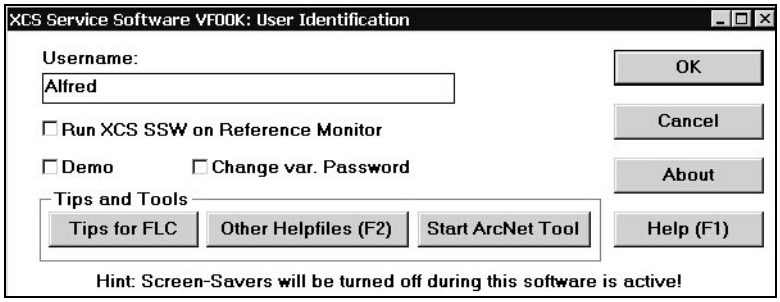


Fig. 1 XCS SSW - 1

- Log on to the XCS SSW.

  The following window appears.

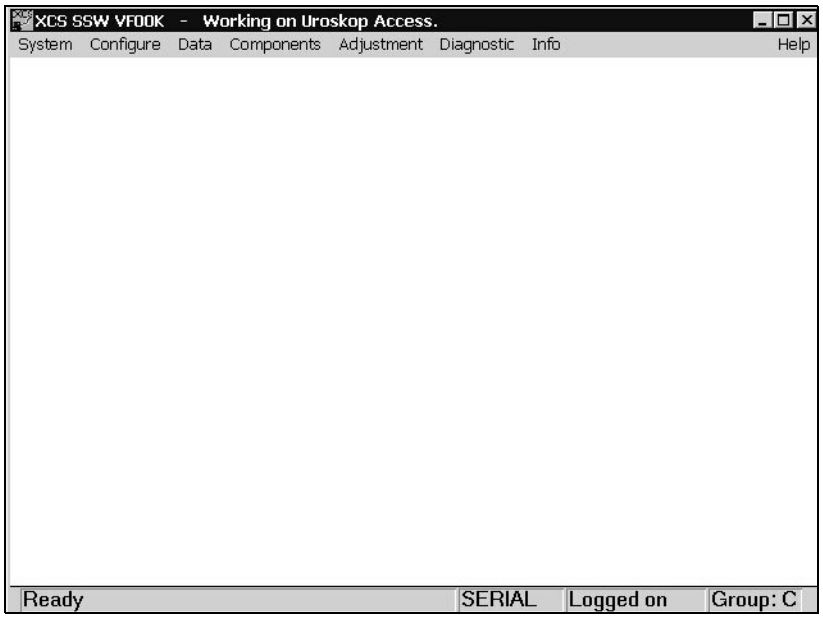


Fig. 2 XCS SSW - 2

- Select "System/Real time clock" (Fig. 3).

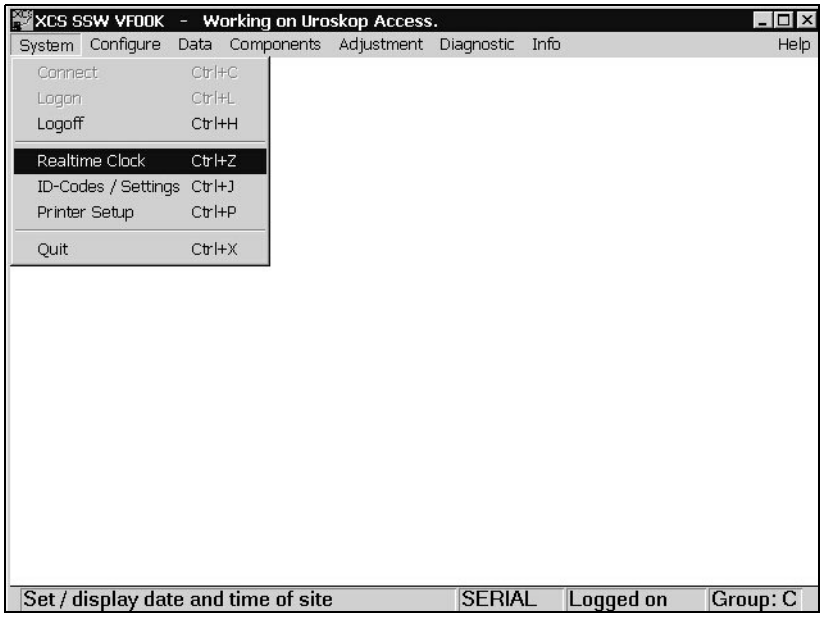


Fig. 3 XCS SSW - 3

The following window appears.

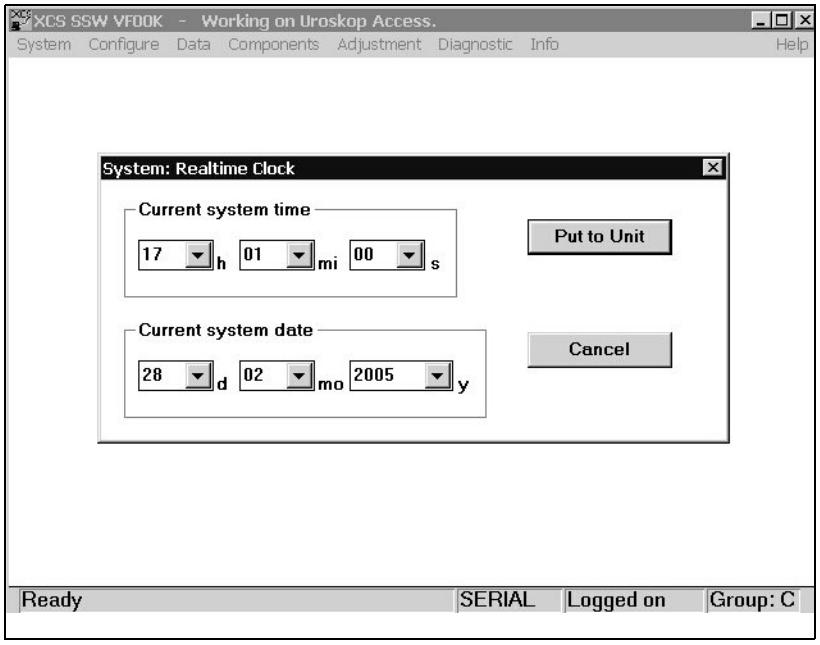


Fig. 4

- Check the current time and date and change if necessary.

NOTE **The summer/winter time correction is made in the UROSKOP Access imaging system (see Operating Instructions).**

Image quality tests

NOTE	**The image quality must be checked as described in the document "Image Quality Quick Test".**

- The following IQ tests must be performed when starting up the system at the customer's site:
  - TV centering,
  - Indirect dose control,
  - Resolution test,
  - Monitor (for all existing monitors),
  - TFT monitors (see settings in the UROSKOP Access Online Help).

Loading test images (if setting required)

NOTE	**The SMPTE test image is used for setting the size of CRT/TFT monitors.**

- To load the test images at the live monitor, select "Local Database/IQ Testimages" in the patient browser.

Hardcopy camera

- For connection and setting of hardcopy cameras see document "Software Description; UROSKOP Access Imaging System VA14A".

Definition of terms for cassettes

The terms "Length" and "Width" that are used are defined in the following sketch.

The position of the cassette in relation to the tabletop is defined by the manner in which the cassette format is written.

NOTE	**The first number always defines the "Width".**

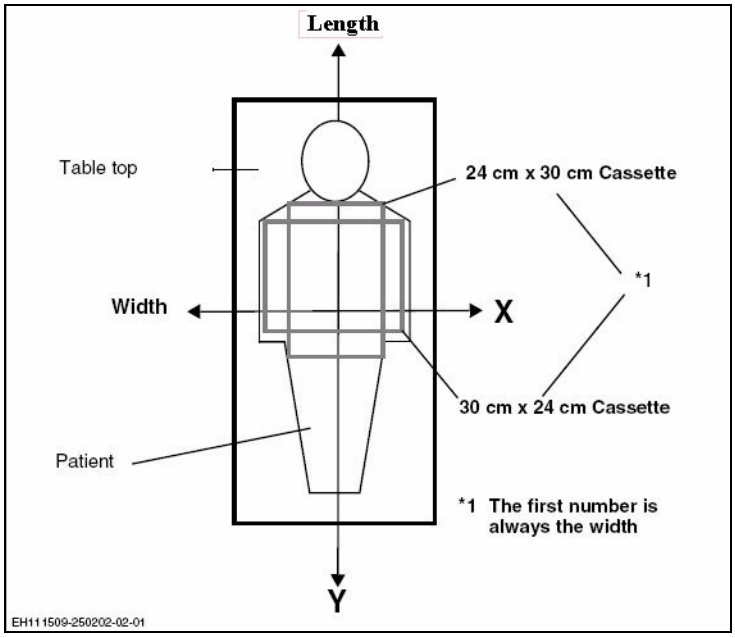


Fig. 1 Terms for cassettes

Testing the cassette (option)

NOTE

To ensure that the settings have not changed during system transport, test exposures must be taken and compared with the radiographs supplied. If these test exposures coincide with the radiographs supplied by the factory or are within the specified tolerances, the factory settings should not be changed.

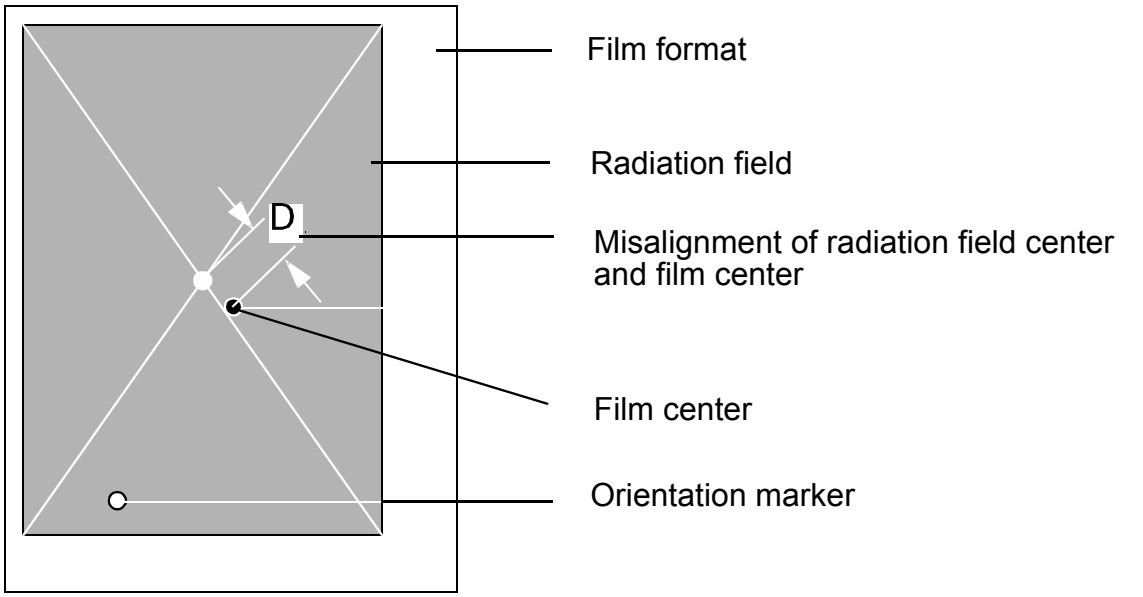


Fig. 2 Coincidence of Radiation Field Center/Film Center

Coincidence of radiation field center and film center

- Move the unit into the 0° position.
- Move the tube assembly and I.I. in the exposure position.
- Select an examination set for cassette use (Iontomat).
- Insert a cassette with a center and side marker with film in the cassette tray (side marker located approx. 3 cm below the center diagonally).
- Release an exposure in following positions for each case according to Tab. 1.

0° position	approx. 10 cm x 10 cm collimation
+90° position	approx. 15 cm x 15 cm collimation
-90° position	approx. 20 cm x 20 cm collimation

Tab. 1 Collimation

- Develop the exposures.

Evaluation

- Mark the radiation field center on the developed films and determine the distance to the film center (center deviation).
- Max. permissible deviation (2% of SID):

$$Center\ deviation\ (\%) = \left(\frac{108}{115\,cm}\right) x100 \leq 2\%$$

- Develop the film and annotate it (exposure data and date).

Coincidence of light field and radiation field

- Move the unit into the 0° position.
- Move the tube assembly and I.I. in the exposure position.
- Select an examination set for cassette use (Iontomat).
- Insert a blank cassette into the cassette tray.
- Place a 35 cm x 43 cm (17" x 14") cassette with film longitudinally onto the tabletop (focus - test film distance r_E = 108 cm).
- Select full format.
- Manually select a format of 30 cm x 38 cm at the collimator.
- Switch on the light localizer. Mark the edges of the light field with radiation attenuating material and also affix a side marker, see Fig. 3.
- Release exposure and develop film (Iontomat).

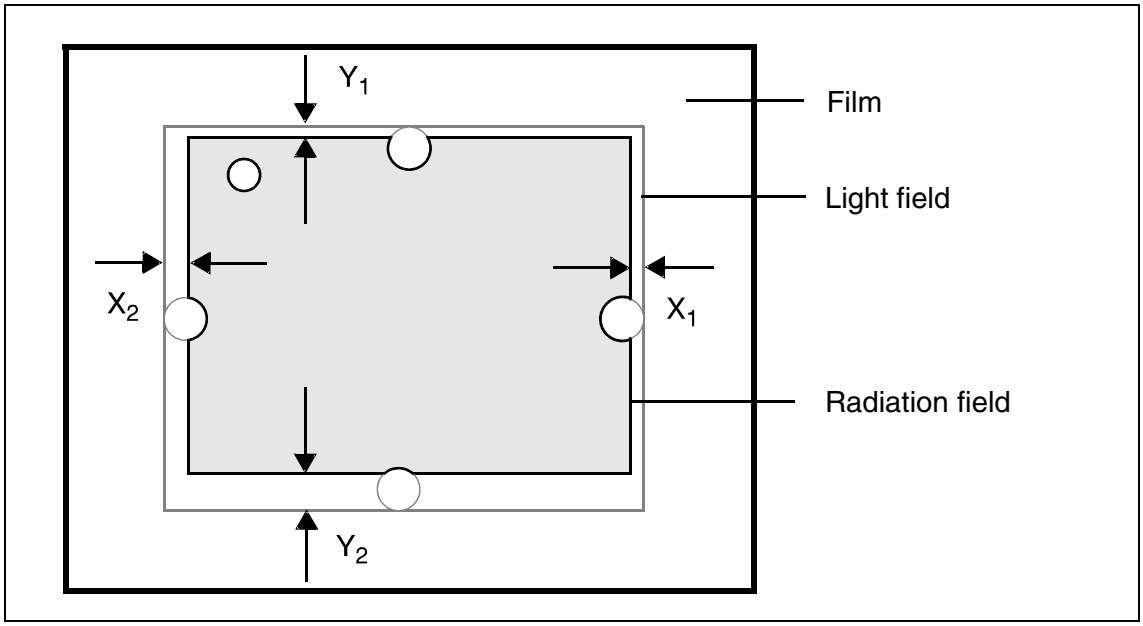


Fig. 3 Coincidence of light field / radiation field

Evaluation

- Measure the difference between the edges of the light field and the edges of the radiation field.
  - Measure all four sides (X_1, X_2, Y_1, Y_2).
- Calculate the total difference in the X and Y directions (independent of the mathematical sign) and record it in the measurement certificate.

SID = 115 cm

Difference in length (cm)		Difference in width (cm)
$Y_1 + Y_2$		$X_1 + X_2$
% Difference in length =	$\frac{\text{Difference in length x 100}}{\text{SID}}$	(Record the value in the measurement certificate)
% Difference in width =	$\frac{\text{Difference in width x 100}}{\text{SID}}$	(Record the value in the measurement certificate)

The difference in length (ΣY) or width (ΣX) must be less than 23 mm each (corresponds to 2% of the SID).

Film/screen combinations used

- At the image system only one exposure stage (BSt) out of the three available for selection **H**, **U** or **D** can be programmed.
- Record the film intended for the screen used with the following data from the manufacturer in the "Test certificate UROSKOP Access":
  - Speed S;
  - Theoretical dose requirement $K_{S;}$
  - Minimum resolution $R_{Gr;}$
  - Color sensitivity of films and screens
- Make sure that you use only films which are sensitized for the light color emitted by the screen (green sensitive film for screen emitting green color, blue sensitive film for screen emitting blue color).

NOTE **There are no standard international regulations regarding the use of film/screen combinations; the national regulations (e. g. §16 RöV) must be complied with.**

Storage phosphor system

In the case of customer documentation with a storage phosphor system, adjustment must be made together with the engineer from the manufacturer of the imaging plates.

Speed S

- Record the sensitivity S (speed) stated by the manufacturer for the film/screen combination.
- In general (legal requirement in some countries) the S value is indicated on the cassette (e. g. S = 200) or in the data sheets of the film/screen combinations.
- According to ISO 9236, the speed of a film/screen combination is defined as the quotient of 1000 µGy and the air kerma (dose) K_S required to obtain an optical density (blackness) of 1 above fog (Fig. 4).

$$S = \frac{1000}{K_S}\mu Gy$$

Fig. 4 Speed

Dose requirement K_S

- If the speed S is known, the theoretical dose requirement K_S must be determined and recorded (Fig. 5).

$$K_S = \frac{1000}{S}\mu Gy$$

Fig. 5 Dose requirement

Minimum resolution R_{Gr}

NOTE

Each dose requirement K_S is assigned a minimum resolution R_{Gr} in LP/mm; i. e. the higher the dose requirement of a film/screen combination, the higher the resolution obtainable with this dose must be so that the increased dose is justified

- Take the relevant minimum resolution R_{Gr} from the diagram (Fig. 6) for the film/screen combination used and record it.

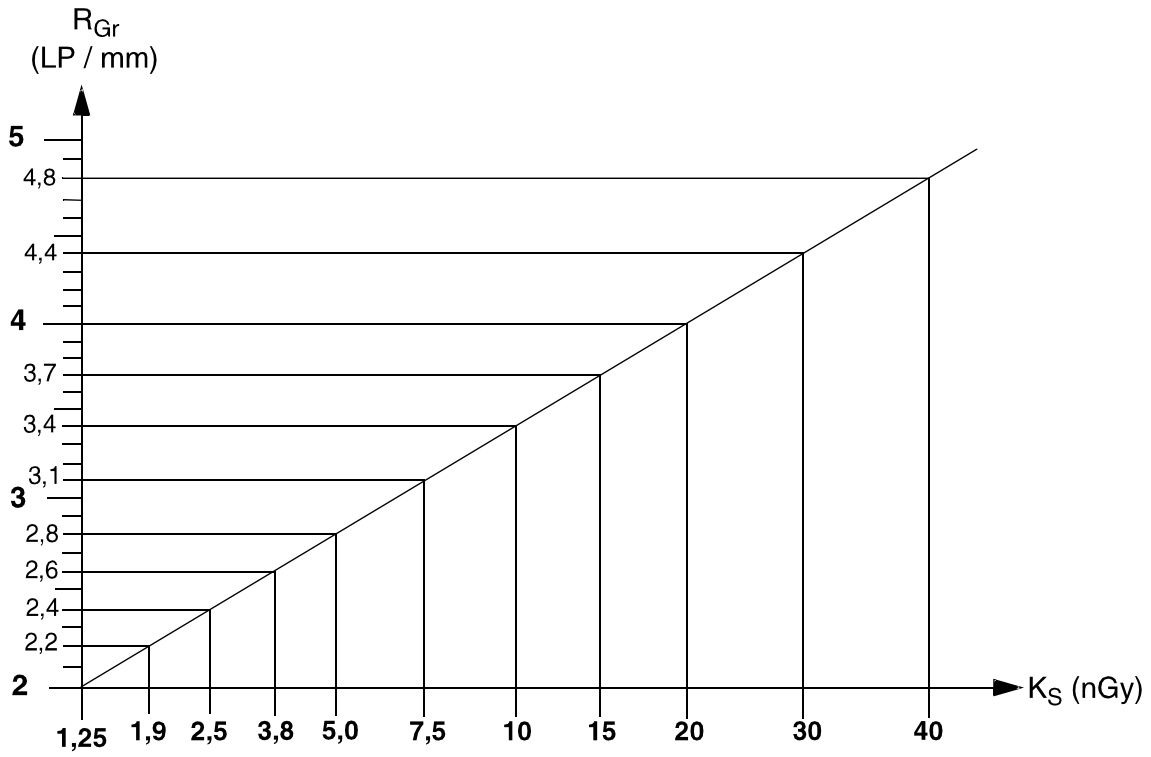


Fig. 6 Minimum resolution - dose requirement

K_S = dose requirement of the film/screen combination acc. to DIN 6867

R_{Gr} = minimum resolution of the film/screen combination acc. to DIN 6868

NOTE

Only one screen type can be programmed in the ASPIA imaging system configuration. The factory setting is Type U.

Changes in the settings are made in the imaging system service software.

IONTOMAT sensitivity

- Select an examination set for cassette use.
- Place a 20 cm $\pm$ 1 cm (5 cm $\pm$ 1 cm) water phantom in the beam path.
- Collimate to the water phantom.
- Choose the following exposure parameters:
  - 81 kV,
  - 80%,
  - Small focus,
  - Exposure stage e.g. "U" (factory setting),
  - Middle Iontomat dominant.
- Select "Components/ Polydoros/Adjustment/Iontomat Sensitivity" in the XCS SSW.
  - Select the IONTOMAT chamber.
  - Check/enter the sensitivity value for exposure stage, e.g. "U" corresponding to the film/ screen combination used.

Recommended values for the basic setting

Screen	Sensitivity
(**H**) 400	12
(**U**) 200	15 (factory setting)
(**D**) 100	18

Tab. 2 Screen - sensitivity

NOTE

With the "Transfer Value" function, the data in the XCU can be updated and test exposures can be taken without exiting the SSW.

Setting with 20 cm water phantom

- Take test exposures with a 20 cm $\pm$ 1 cm water phantom (film format $\geq$ 35 cm x 43 cm) for all screens and check the film density.
  - The films must have the optical density required by the customer.
  - If no specific density is required, set the net optical density $D_N = 1$ (density 1.0 + fog).
  - If required, correct the sensitivity value for the screen type used H, U or D.
- Enter the configured values and measured values into the "Test certificate UROSKOP Access".

Setting with 5 cm water phantom

- Select the exposure stage, e.g. "U".

- Take test exposure with 5 cm ± 1 cm water phantom.
- Set the net optical density for the 5 cm water phantom to the same value as for the 20 cm water phantom.

  With the 5 cm water phantom the density is set using the "Lead" function in the "IONTOMAT Sensitivity" window.

The "Lead" setting applies for all three exposure stages H, U or D.

- Exit the window with "OK".

IONTOMAT voltage response correction

- Select an examination set for cassette use.
- Place a 20 cm ± 1 cm water phantom in the beam path.
- Collimate to the water phantom.
- Use following exposure parameters:

60 kV	80%	small focus	e.g. exposure stage U	middle Iontomat dominant
125 kV	80%	small focus	e.g. exposure stage U	middle Iontomat dominant

- Select "Components/Polydoros/ Adjustment/Voltage Response Correction" in the XCS SSW.
  - Determine and enter the correction curves H, U or D corresponding to the configured film/screen combination.

Value ranges: < 81 kV: 0...13

≥ 81 kV: -13...0

NOTE

With the "Transfer Value" function the data in the XCU can be updated and test exposures can be taken without exiting the SSW.

- For the screen used take test exposures at 60 kV and 125 kV with 20 cm ± 1 cm water and check the film density in each case.
  - The film density at 60 kV and 125 kV must correspond to the film density at 81 kV (see subchapter "IONTOMAT sensitivity").
  - The deviation in density may be
    D_{opt} (81 kV) - D_{opt} (60 kV) ≤ 0.2
    D_{opt} (81 kV) - D_{opt} (125 kV) ≤ 0.2
    of the optical density.
  - If necessary, select different correction curves for the lower or upper kV range.
- Exit the SSW dialog with "OK".

- The following graph and the associated table of values show the correction curves 1...13 for the lower kV range (40...81 kV) and the correction curves -1...13 for the upper kV range (81...150 kV).

  Here you can check the change in exposure points and density resulting from changing to a different correction curve for specific kV values.

NOTE	**A change by 1 exposure point results in a change in density of approx. Δ S = 0.25.**

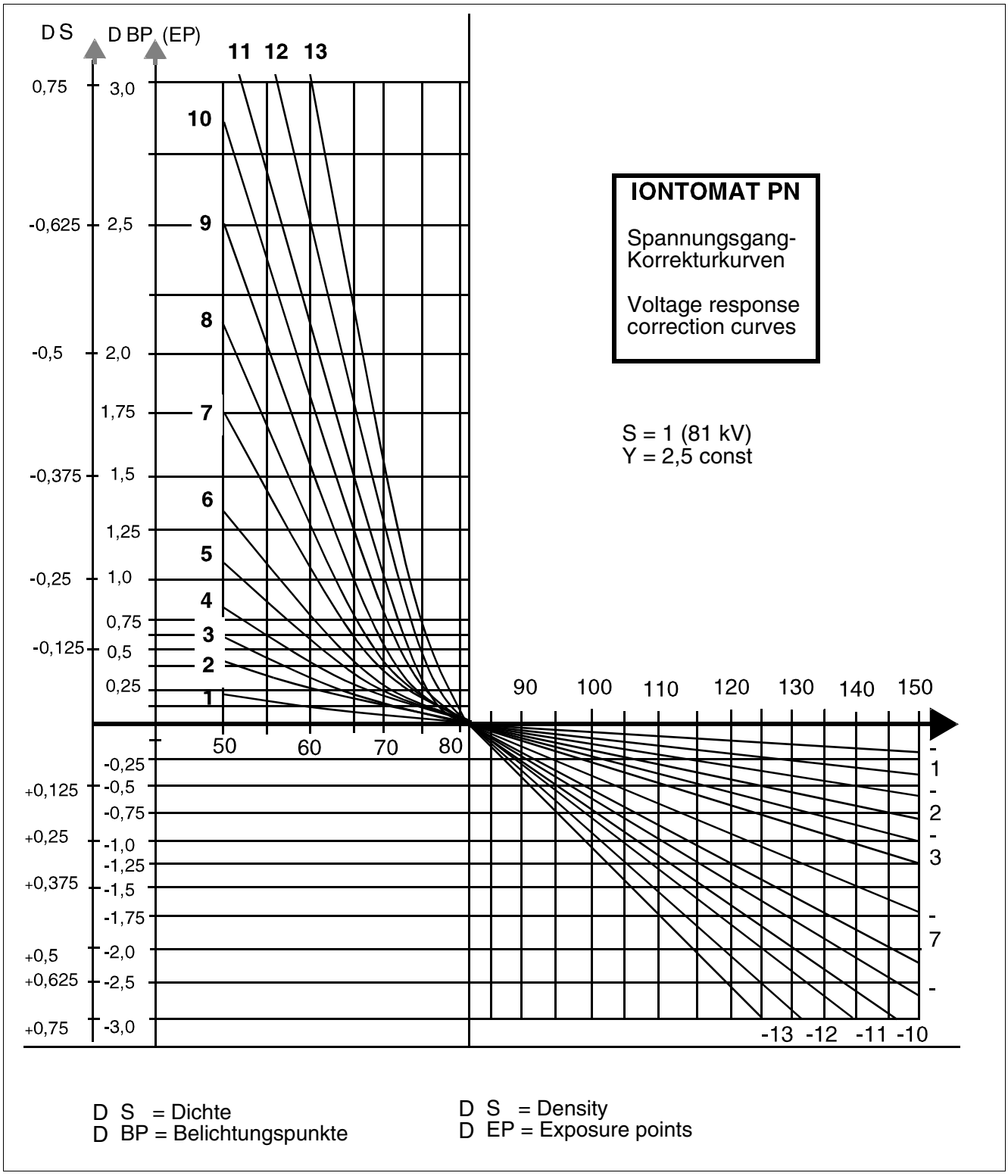


Fig. 7 Voltage Response Correction Curves

(≤ 81 kV)	Corrections for the lower kV range (≤ 81 kV)												
kV	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
40	48	42	35	32	28	24	20	16	13	11	8	6	3
41	47	41	34	31	27	23	19	15	13	10	8	6	3
42	46	40	33	30	26	23	19	15	12	10	8	5	3
44	44	38	31	28	25	21	17	13	11	9	7	5	2
46	41	35	30	26	23	20	16	12	10	8	7	4	2
48	39	33	28	25	22	18	15	11	10	8	6	4	2
50	37	31	26	23	20	17	14	10	9	7	5	4	2
52	34	29	24	21	18	15	13	9	8	6	5	3	2
55	30	26	21	18	16	13	11	8	7	6	4	3	1
57	28	23	19	17	14	12	9	7	6	5	3	2	1
60	24	20	16	14	12	10	8	6	5	4	3	2	1
63	20	17	13	11	10	8	6	5	4	3	2	2	1
66	16	13	10	9	8	6	5	4	3	2	2	1	1
70	11	9	7	6	5	4	3	3	2	2	1	1	0
73	8	6	5	4	3	3	2	2	1	1	1	0	0
77	3	3	2	2	2	1	1	1	1	0	0	0	0
81	0	0	0	0	0	0	0	0	0	0	0	0	0
85	-2	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
90	-4	-3	-3	-2	-2	-2	-1	-1	-1	-1	-1	0	0
96	-7	-6	-6	-4	-4	-3	-3	-2	-2	-1	-1	-1	0
102	-10	-8	-8	-6	-5	-4	-4	-3	-2	-2	-1	-1	0
109	-13	-11	-11	-9	-7	-6	-5	-4	-3	-2	-1	-1	-1
117	-18	-15	-15	-11	-10	-8	-6	-5	-4	-3	-2	-2	-1
125	-24	-20	-20	-14	-12	-10	-8	-6	-5	-4	-3	-2	-1
133	-31	-25	-25	-17	-15	-12	-10	-7	-6	-5	-4	-2	-1
141	-40	-32	-32	-21	-18	-15	-11	-8	-7	-6	-4	-3	-1
150	-53	-40	-40	-26	-21	-17	-14	-10	-8	-7	-5	-3	-2
kV	**-13**	**-12**	**-11**	**-10**	**-9**	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**
(> 81 kV)	**Corrections for the upper kV range (> 81 kV)**												

BP = exposure points

In the table Δ BP are indicated as 1/8 BP.

Cutoff dose and resolution

- The values are recorded in the "Test certificate UROSKOP Access".

  They can then be copied for the acceptance test according to §16 RöV.

Measuring conditions

- Select an examination set for cassette use.
- Choose the density correction to ± 0 exposure points.
- No additional filters are selected at the collimator.
- Remove the table mat.

Test phantoms

Area of applicability of §16 RöV	Other countries
Place a 25 mm Al test phantom (measuring system) on the tabletop into the beam path.	Place a 2.1 mm Cu filter on the collimator.

- Choose following exposure parameters:
  - 77 kV,
  - Small focus,
  - 80%,
  - Middle Iontomat measuring field.

- Release exposure.
- Record the kV value in the "Test certificate UROSKOP Access".

Procedure

Dali

- Place the dose measuring chamber on the tabletop centrically to the center Iontomat measuring field.

Diados:

- Place the dose detector on the tabletop outside the center Iontomat measuring field. Set the filter to 27.5 mm Al at the Diados detector.
- Place the resolution test, type 42, on the tabletop at 45° to the patient axis outside the center Iontomat measuring field.

- Perform the following measurements for the exposure stage H, U or D :
  - Measure the cutoff dose K_T.
  - Develop the film and measure the optical density D (with fog).
- Determine the resolution R_g of the film.

$$K_B = \frac{K_T \cdot f_K}{m}$$

Fig. 8 Cutoff dose in the image receptor plane

K_T	Cutoff dose measured on the table
K_B	Cutoff dose in the image receptor plane
m	Unit attenuation factor without cassette = 2, with cassette = 2.2
$f_K = 0{,}94$	Correction factor for Dali measuring chamber
$f_K = 1{,}0$	Correction factor for Diados detector

- Calculate the cutoff dose K_B.

Resolution R_g

For each film/screen combination R_G must be $\geq R_{Gr}$.

NOTE	**If the minimum resolution R_{Gr} is not achieved, check the screen for damage and contamination and the cassette for correct insertion of the screen.**

- Record all values determined into the "Test certificate UROSKOP Access".

Function of the measuring fields (difference of dominants)

- Select an examination set for cassette use.
- Set 1-point technique 77 kV.
- Set density correction to $\pm$ 0 exposure points.
- No additional filters are selected at the collimator.
- Insert the cassette with screens corresponding to the set exposure stage, e.g. U.

Test phantoms

Area of applicability of §16 RöV	Other countries
Place a 25 mm Al test phantom (measuring system) on the tabletop into the beam path.	Place a 2.1 mm Cu filter on the collimator.

- Choose following exposure parameters:
  - 77 kV,
  - Small focus,
  - 80%.
- Determine the optical density of the films and calculate the differences in density.

  $\Delta D_{\text{left measuring field}} = |D_{\text{center measuring field}} D_{\text{left measuring field}}|$

  $\Delta D_{\text{right measuring field}} = |D_{\text{center measuring field}} D_{\text{right measuring field}}|$

  Tolerance: $\Delta D \leq 0.3$
- Record the values in the "Test certificate UROSKOP Access".

Drift and hum voltage of the Iontomat chamber

NOTE	**The generator must have been switched on for at least 5 minutes before the test is performed.**

Checking the drift

- Connect the oscilloscope to following connecting points

  CH1: D100.X63.VION and D100.X63.AGND
  Trigger: D100.X64.SWR

NOTE	**If a digital oscilloscope is used, the measurement must not be made in the "Glitch Detect Mode" (averaging, smoothing), since this can result in incorrect measuring results.**

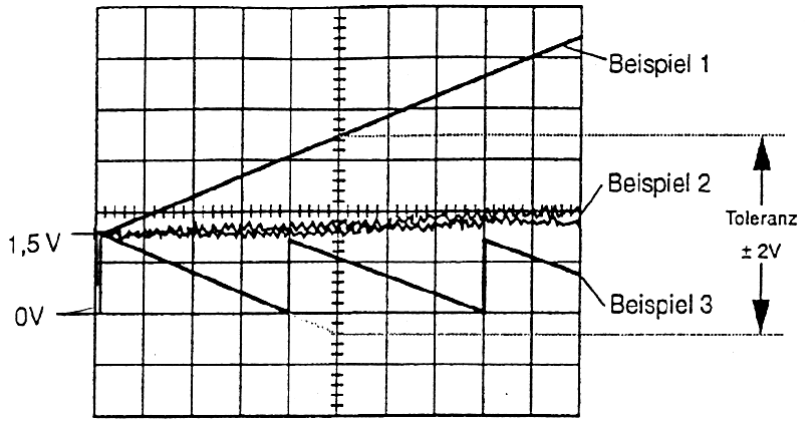
- Switch off the I.I. voltage supply.
- Cover the collimator with sufficient lead.
- Load a blank 35 cm x 43 cm cassette.
- Close the collimator.

NOTE	**The collimator must be closed again each time a cassette has been inserted.**

- Switch the SS switch on the D100 board "on".
- Select the menu "Components/Polydoros SX/Diagnostic/Iontomat Drift" in the XCS SSW.
- Select the center measuring field and measure the drift according to the instructions in the SSW.

  Maximum drift: 0 + 2 V/0.5 s (with SS switch = "on", example 2, 3)

NOTE	**With SS switch = "off" maximum drift "0 $\pm$ 1 V/0.5 s" (example 1, is not measured).**



Oscillogram 1:

Drift at
D100.X63.VION

1 V/T

0.1 s/T

NOTE	**If the drift is too large, check if the lead cover is sufficient.**

- Close the window with "OK" and exit the XCS SSW.
- Remove the lead at the collimator and switch the I.I. voltage supply back on.

Checking the hum voltage

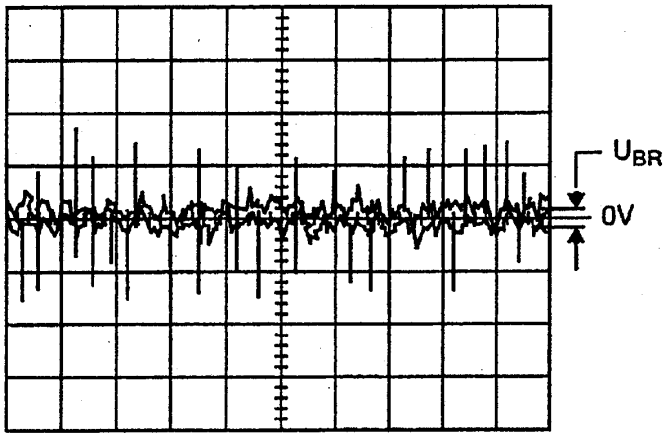
- Connect the oscilloscope to following connecting points:

- Oscilloscope: CH1: D100.X63.VION and D100.X63.AGND
  Trigger: D100.X64.SWR

- Select all measuring fields in sequence and measure the hum voltage for each measuring field during the exposure.

Max. permissible hum voltage < 20 mVss

NOTE	**Make sure that the cassette is moved in completely during each measurement.**



Oscillogram 2:
Hum voltage at
D100.X63 DL_IN

10 mV/T

10 ms/T

Check the fluoro programs

NOTE

No other characteristic curves than listed below are permissible! If the characteristic curves are entered incorrectly or in the wrong order, the default examination sets (available on CD "Service Tools UROSKOP Access VA01A") have to be restored according to the document "Software Description; UROSKOP Access Imaging System VA14A".

NOTE

If the characteristic curves are adopted correctly at the startup of the imaging system, the following characteristic curves must be entered as default examination sets.

- Select "Configuration" in the UI under "Options".

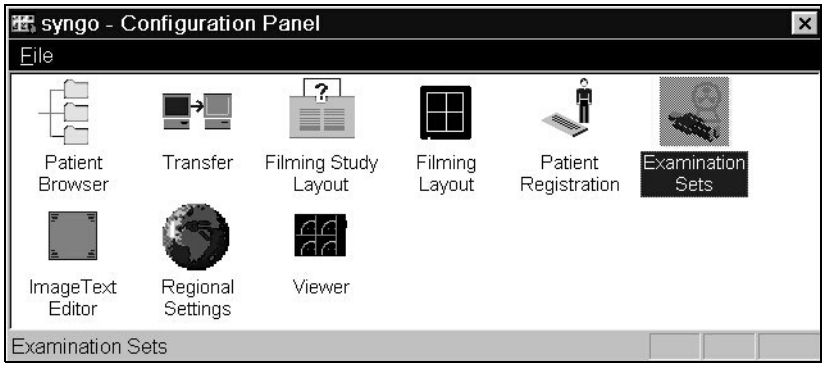


Fig. 9 Configuration panel

- Double-click on "Examination Sets".

  The "User program configuration" window is displayed.

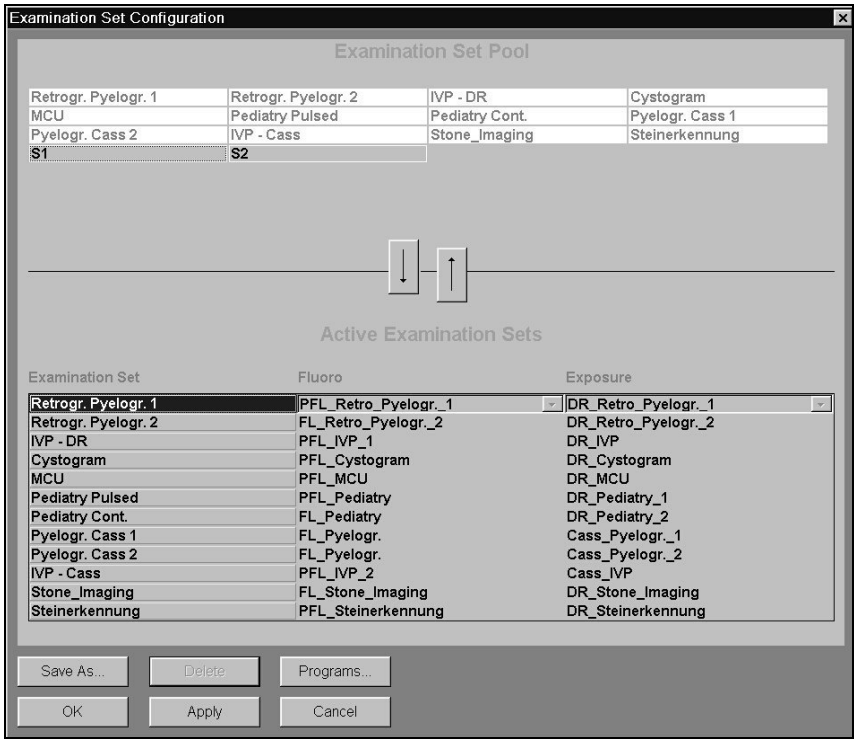


Fig. 10 Examination Set Configuration

- To check the examination sets, select them one after the other (Fig. 10) and check the default values (Tab. 3) by selecting the "Programs" button.

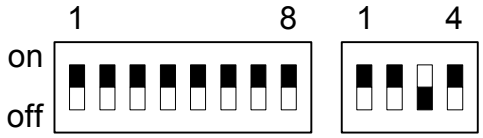
Examination Set	Mode selection	Curve selection	Dose level
S2	Standard Fluoro	C03 - Iodine	Medium
Retrogr. Pyelogr. 2	Standard Fluoro (High Contrast)	Litho 63 kV HK	Medium
Retrogr. Pyelogr. 1	Pulsed Fluoro	Antiiso Access (12.5 pulses/s)	High
Pediatry	Pulsed Fluoro	Pediatry (12.5 pulses/s)	Low

Tab. 3 Standard examination sets

Data printer (option)

The data printer type Star DP8340S must be used.

- Program the DIP switches as follows.



- Connect the data printer to the voltage supply.
- Connect a serial interface cable to the printer and to the XCU.X62.
- Insert an ink ribbon into the printer (see printer description).
- Insert paper and switch the printer on.
- Release radiation under DR.

NOTE	**The printer is activated automatically at the end of the exposure / exposure series.**

- Check if the kV and mAs values and the value of the area dose product displayed on the monitor correspond to the values on the label.

NOTE	**Note that the area dose product is printed out for each individual exposure or exposure series whereas on the monitor the total area dose product is displayed.**

- The labels must be printed in the vertical direction and in the center.

Fluoroscopy

Programming and documenting customer-specific fluoroscopy values

NOTE	**The tests and measurements performed so far were carried out to ensure that the system is working properly from a technical point of view. To satisfy the user it may be necessary to adapt the system to its specific medical use and procedures on site.**

NOTE	**All characteristic curves are programmed in the factory and should not be changed.**

NOTE	**The customer-specific control curves, if wished, should be changed and recorded on-site.**

Note relating to the acceptance test according to §16

- Following the assignment of the customer-specific fluoroscopy curves, the dose rate must be measured for all FL levels and I.I. formats and recorded in the acceptance test certificate together with the resulting kV and mA values.
- Use a prefiltration of 25 mm Al + 1.5 mm Cu.

NOTE	**The dose rate values measured with 25 mm Al + 1.5 mm Cu correspond to the values resulting with 2.1 mm Cu. However, the kV and mA values resulting from these settings are different.**

Maximum fluoroscopic time

- Observe the country-specific regulations regarding the max. fluoroscopic time.

  The factory setting is as follows:

	Fluoroscopy alarm	Fluoroscopy blocking
Canada/ USA	5 min	n.a.
Europe	5 min	10 min

- If the fluoroscopic time has been changed, a functional test must be performed.

Programming the organ programs

Default organ programs have already been set at the factory.

- Customer-specific organ programs can be set according UROSKOP Access Operating Instructions.

Available fluoroscopy curves

The current fluoroscopy curves can be viewed in the XCS SSS Help.

- Select "XCS Help" in the XCS program folder on your service PC.
- Select the menu "List of all tables" and subsequently "Fluoro curves".

Functional test of the endoscopy interface

- Once the system has powered up, no LED must light up at the endoscopy interface.
- On the hand control unit, press the "Ref/Endo/US" key to select the image source.
- If the optional system foot switch is used, switch over the image sources (functions) alternately at the hand control unit and the system foot switch.
- Every time the image source was switched over, the following LEDs must light up in sequence or remain dark at the optional endoscopy interface:
  - Endoscopy Input => Ultrasound Input => no LED => Endoscopy Input => etc.
- The reference monitor on the TFT support arm shows the reference image mask only if endoscopy/ultrasound is not selected. Otherwise, the reference image mask is switched off..

NOTE

When using/ connecting an endoscopy camera, please observe the document "Troubleshooting Guide; Endoscopy Option" for settings.

NOTE

Although the two inputs (S-Video; Video) have the same function, the S-Video input is recommended because it offers better signal quality. If both inputs are supplied with a signal at the same time, only the S-video signal will be transmitted and visible on the monitor.

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Measures

Covers

- Attach all covers to the lifting base and the unit.

Deleting the exposure counter

- Select "Info/Operating Time" in the XCS SSW.
- Select the tube and then "Erase tube".
  - Confirm the message "Erase tube date?" with "Yes".

Backup of site data

NOTE	**On completion of the startup, perform a backup.**

- Insert the backup disk (Site data disk) into drive "a:" of your service laptop.
- In the XCS SSW program, select "Date/Backup to disk" and start the backup procedure with "OK".

Deleting the XCS error log

- Select "Diagnosis/Error Log" in the XCS SSW.
- Select "Get from unit".
- Select "Delete All".
  - Save the error log to disk. During the initial period of system operation the log must be evaluated and may be used for comparison.
- Close the error log menu with "Close".
- Exit the XCS SSW program with "System/Quit".

Completing the certificates

- On completion of all settings and check measurements, the technician carrying out the work must sign and date the test certificates (UROSKOP Access test certificates, POLYDOROS test certificates, IQ test certificates) and country-specific certificates (e. g. DHHS, RöV §16) to confirm that all values were determined and recorded correctly.

Completing the Installation Protocol

The manufacturer of this product requires information and the legislator demands proofs that a product delivered free of defects from the factory continues to possess the required and certified quality properties on installation and start-up.

It is therefore absolutely necessary that the installation protocol with the installation and start-up data is sent without delay after completion of the work to the address stated on the installation protocol.

You will find the report in the system binder.

Checking the accessories

- Check the supplied accessories for completeness and damage.

Checking image reversal

- Select a patient.
- Place the test object "R" on the tabletop in the center of the radiation field so that it is legible from the unit base side.

- Set the patient position "prone standard" and briefly release radiation.

  The "R" is displayed on the monitor as follows:

- Set the patient position "prone turned" and briefly release radiation.

  The "R" is displayed on the monitor as follows:

- Set the patient position "supine turned" and briefly release radiation.

  The "R" is displayed on the monitor as follows:

- Set the patient position "supine standard" and briefly release radiation.

  The "R" is displayed on the monitor as follows:

Checks and tests

Testing the system emergency shutdown button (if available)

- On actuation of the system emergency shutdown button, the entire system must be disconnected from the mains supply.

Testing the protective ground wire

NOTE	**The following first ground wire test must be performed for the safety of startup personnel.** **The final ground wire test is performed at the end of the startup procedure. Therefore the documentation applies only to the final ground wire test which delivers the initial measurement value.** **The initial measurement value is used as a comparative value for subsequent measurements and must be documented.**

- Perform the ground wire test according DIN VDE 0751, part 1 (ARTD part 2).

  It has to be ensured that the system is completely installed, all covers are attached and all ground wire connections have been made. Test the protective ground wire resistance between the protective conductor bus bar for the entire system or the protective contact at the unit plugs and any accessible, conductive part of the product that can accept voltage in cases of error.

The acquired measuring values have to be documented and evaluated together with information about the used measuring device (type and serial number).

The protective ground wire resistance may not exceed 0.2 Ohm.

NOTE	**Ensure that control or data cabling does not affect ground wire connections.**

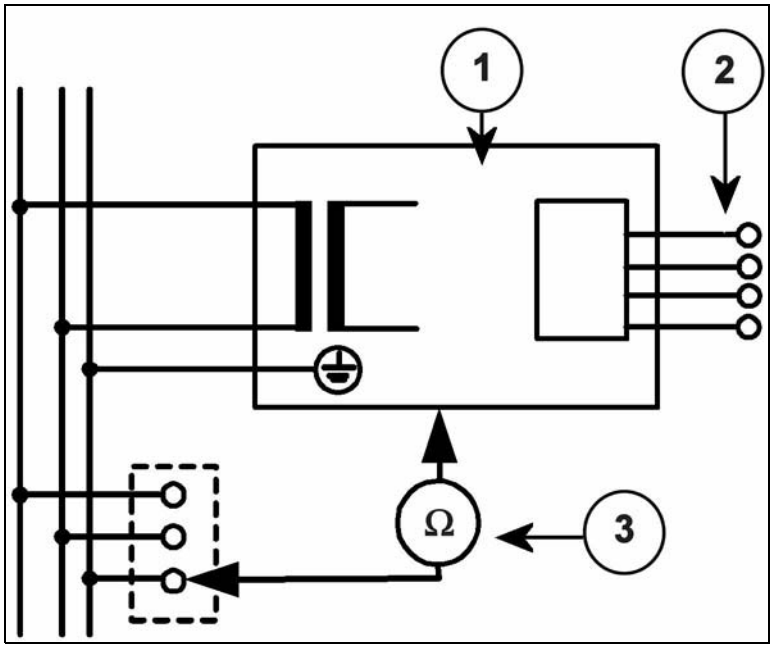

Fig. 1 Measurement circuit for protective ground wire measurement of systems with hard-wired connections; according DIN VDE 0751-1:2001-10, C3

1 = System

2 = Applied part type B

3 = Measurement application (integrated in measuring device)

Chapter 1	"Tools and auxiliaries required" revised; "Additionally required documents" revised; "Safety information" revised; "Completing the 'Report of Installation and Operation'" removed; "Information on startup" revised; "Conventions and abbreviations" revised
Chapter 2	"Testing the protective ground wire" revised; "Measuring the internal line resistance (mains quality)" revised; "Functional test of the EMERGENCY STOP buttons" revised
Chapter 3	"UROSKOP Access service software" removed; "UROSKOP Access Online Help" newly added; "Connecting the service PC to the generator" newly added; "Variable password for the XCS service software" removed
Chapter 4	"Unit movements" revised; "Testing the generator with high voltage" revised; "Checking the fluoroscopic field limitation and centering" revised; "Creating test program for dose adjustment (if not available)" revised; "Testing the KermaX (option)" revised
Chapter 5	"Switching on the imaging system" revised; "Settings and tests on the XCU" replaced by "Checks and adjustments"; "IQ tests required" revised; "Loading test images (if setting required)" revised; "Hardcopy camera" revised
Chapter 6	"Definition of terms for cassettes" newly added; "Testing the UROSKOP ACCESS cassette (OPTION)" revised; "Film/screen combinations used" revised; "Storage phosphor system" revised; "IONTOMAT sensitivity" revised; "IONTOMAT voltage response correction" revised; "Cutoff dose and resolution" revised; "Drift and hum voltage of the Iontomat chamber" revised; "Edit fluoro programs" replaced by "Check of the fluoro programs"; "Data printer (option)" revised
Chapter 7	completely revised
Chapter 8	n. a.
Chapter 9	"Completing the 'Report of Installation and Operation'" replaced by "Completing the Installation Protocol"; "Checking image reversal" revised; "Testing the system emergency shutdown button (if available)" newly added; "Testing the protective ground wire" completely revised

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